



Edd Clark & Associates, Inc.

Environmental Consultants

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Job No. 0268,002.96

Ms. Judith Brown
669 Congo Street
San Francisco, CA 94131

**Feasibility Study/Corrective Action Plan
18460 Sonoma Highway
Boyes Hot Springs, California**

Dear Ms. Brown:

Please accept this as Edd Clark & Associates, Inc.'s (EC&A's) Feasibility Study/Corrective Action Plan (FS/CAP) for 18460 Sonoma Highway (site) in Boyes Hot Springs, California (Figure 1). The purpose of the FS/CAP is to review past regional and site-specific data and identify the most cost-effective technologically feasible method to remediate soil and groundwater impacted by fuel hydrocarbons (FHCs) from underground storage tanks (USTs) formerly located at the site. The FS/CAP was requested by the County of Sonoma Department of Health Services (CSDHS) in their letter dated July 31, 2000. With the approval of the CSDHS, submittal of this FS/CAP was deferred until the plume of FHCs in groundwater was adequately defined.

In addition to the FHC release, there was a release of halogenated volatile organic compounds (HVOCs) from a dry cleaner formerly operating at the site. Before the FS/CAP could be completed it was necessary to evaluate the HVOC plume because there was interference between the FHC analyses and HVOC analyses, which resulted in false-positive elevated FHC concentrations and obscured the detection of low concentrations of the volatile components of gasoline. Additionally, the HVOC plume impacts remediation options for the FHC release. Following CSDHS approval of this FS/CAP, a Remedial Action Plan (RAP) will be prepared to provide the details of implementing the selected remedial option.

BACKGROUND

Site Description

The site is located in a light-commercial and residential land-use area and is paved with asphalt and is relatively flat. The ground surface slopes gently to the west and north. There is a small creek located about 75 yards north of the site that flows to the west. The nearest cross street is West Thompson Avenue. A one-story commercial building currently occupies the site (Figure 2). Reportedly, the building was occupied by a dry cleaning business for 10 to 20 years until about 1993; after which time, a motorcycle-repair shop occupied the building until about 1998. Currently, PC Metro, a cell phone business occupies part of the building.

The property adjacent to the west of the site is occupied by an apartment building and parking lot; to the east is Sonoma Highway. The property to the north is occupied by the office of Bragg's Plumbing, a party-supply store, and two residential buildings that front on Mulford Lane. The property to the south is occupied by a produce market. Sewer and water services at site and site vicinity are provided by the County of Sonoma and the Valley of the Moon Water District, respectively.

Two former 1000-gallon USTs for gasoline were located between the east side of the commercial building and Sonoma Highway. This location is approximately 18 feet (ft) from the highway (Figure 3). There are numerous underground utilities in the immediate area. The western end of the USTs that formerly occupied the site, extended under the onsite structure, approximately 4 ft. The location of the former USTs is paved with asphalt.

A dry cleaning facility was formerly located in the northwest corner of the building. A floor drain located near the middle of the north wall of the building in a small room adjacent to the former dry cleaning facility is believed to be the former location of a tetrachloroethene (PCE) release. The floor drain connects to a sewer line that extends westward from a point outside of the north wall of the building. Effluent from a toilet and sink entered the line from the onsite building. Near the northeast corner of the building, the sewer line turns to the northwest and extends beneath the Braggs Plumbing & Heating building to join the Mulford Street sewer line near monitoring wells MW-8/MW-8D. According to Barry Hines, a realtor who represents the site owner, when the sewer lines were inspected in August 2004, the line to Mulford Street was found to have been invaded by tree roots. On March 15 and 16, 2006, EC&A observed abandonment of the sewer line under the Braggs Plumbing & Heating building. A new line was installed that carries effluent from the site to the Mulford Street sewer line without going under the Braggs Plumbing & Heating building.

August 1995 UST Removal

On August 16, 1995, the Fuel Oil Polishing Company (FOPCO) uncovered and inerted two 1000-gallon USTs for gasoline. The USTs were rusted and pitted and a slight petroleum hydrocarbon odor was observed from the excavation and backfill material. The USTs were not removed from the excavation because their removal would have undermined the building foundation.

At the request of the CSDHS, sample T1-GW was collected from water in the open excavation on August 16, 1995. In anticipation of over-excavation of fuel hydrocarbon- (FHC-) impacted soil and to assess whether the water in the excavation was perched and not representative of actual groundwater-table levels, the excavation was dewatered after water sample T1-GW was collected. Soil sample T1-SW was collected from the UST excavation floor at about 6 ft after the excavation was dewatered. Soil samples SP-1 and SP-2 were also collected from the soil excavated to expose the USTs.

Soil and groundwater samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene and xylenes (BTEX). Soil samples were also analyzed for total lead. Relatively low concentrations of TPHg (17 milligrams per kilogram [mg/kg]), toluene,

ethylbenzene and xylenes were detected in T1-SW. Relatively high concentrations of TPHg (9300 mg/kg) and BTEX were detected in SP-2. TPHg and benzene were detected in T1-GW at 13,000 micrograms per liter ($\mu\text{g/l}$) and 860 $\mu\text{g/l}$, respectively. Analytical results for UST removal soil and groundwater samples are presented in Table 1.

October 1995 Over-excavation

The location of the former USTs was over-excavated by FOPCO on October 18, 1995. Prior to removing FHCs-impacted soil, the portions of the USTs that were not beneath the building foundation were cut and removed from the excavation and transported to West Coast Metals in Windsor, California, for recycling. Two approximately 4 ft-long by 4 ft-wide sections of the USTs were left beneath the building.

Approximately 60 cubic yards (cu yds) of FHC-impacted soil were excavated and stockpiled onsite. The final dimensions of the excavation were about 16 ft by 11 ft with a depth of 14 ft. The extent of over-excavation was constrained by the building location to the west, a PG&E utility trench, to the east, and a driveway, to the south. Groundwater did not enter the excavation during the time it remained open.

Six soil samples (P-1 through P-6) were collected from the excavation floor and sidewalls. The greatest concentrations of FHCs were detected in samples from the west and north sidewalls of the excavation at 10 ft below the ground surface (bgs); these were samples P-3 and P-6, respectively. TPHg was detected at a maximum concentration of 1600 mg/kg in these samples. Very low concentrations of FHCs, including only 6.2 mg/kg TPHg, were detected in P-2 from the excavation floor at 14 ft bgs. The results of analyses of samples from over-excavation activities are presented in Table 2.

On October 19, 1995, the excavation was backfilled with clean imported material to approximately 5 ft bgs; the remaining 5 ft of the excavation was backfilled with road base. The excavation was lined with visqueen prior to backfilling. On December 30, 1995, the stockpiled soil was transported to Redwood Landfill in Novato, California, for disposal.

November 1997 Soil and Groundwater Investigation

To delineate the lateral and vertical extent of FHC-impacted soil and assess the impact to groundwater in the location of the former USTs, EC&A directed the installation of six soil borings (B-1 through B-6) at the locations indicated on Figure 3. The results of this investigation were transmitted to the CSDHS in EC&A's *Soil and Groundwater Investigation Report* dated April 27, 1998. Boring logs for this investigation are included in Appendix A.

Five borings (B-1 through B-5) were drilled in the parking area and driveway east and south, respectively, of the location of the former USTs. Boring B-6 was drilled in the building interior about 38 ft west of the former USTs. An attempt was made to drill a boring east of the former USTs; however, underground utilities prevented successful drilling in this area.

Soil Sample Analytical Results

Soil and groundwater samples collected during drilling were analyzed for TPHg, methyl tert-butyl ether (MTBE) and BTEX. Soil samples collected from borings B-1 and B-2 were also analyzed for total lead. Groundwater samples collected from borings B-1, B-2, and B-3 were also analyzed for dissolved lead. A total of 16 soil samples and six groundwater samples were analyzed.

Field screening with the Gastechtor combustion meter and/or observation of soil conditions did not indicate FHCs from the ground surface to about 8 ft bgs in any of the soil borings. Laboratory analysis of soil samples reported that FHCs were not detected in B-1, B-4 and B-6. Very low concentrations of FHCs were detected in B-3 and B-5.

The highest concentrations of FHCs were detected in the sample from about 10 ft bgs in B-2 (600 mg/kg TPHg). MTBE was not detected in any of the soil samples. Except for the sample from B-2 at 10.5 ft bgs, the reporting limit for MTBE was 0.05 mg/kg. Total lead was detected from below the reporting limit of 3.0 mg/kg to 8.0 mg/kg. Soil sample analytical results are presented in Table 3.

Groundwater Sample Analytical Results

FHCs were not detected in groundwater samples from B-1 and B-4. TPHg was detected in groundwater samples collected from B-2, B-3, B-5 and B-6. Benzene was detected in groundwater samples collected from B-2, B-3 and B-5. The highest concentrations of TPHg and benzene were in groundwater samples from B-2 at 4400 µg/l and 200 µg/l, respectively. MTBE was not detected in groundwater samples collected from B-1 through B-6 above reporting limits ranging from 5.0 µg/l to 80 µg/l. Groundwater samples collected from B-1, B-2 and B-3 were also analyzed for dissolved lead; lead was not detected above the reporting limit of 0.005 mg/l. Grab-groundwater sample analytical results are presented in Table 4.

March and April 1999 Groundwater Investigation

On March 31 and April 1, 1999, EC&A directed the installation of MW-1, MW-2 and MW-3 to depths of 25 ft, 20 ft and 25 ft, respectively. MW-2 was completed at 20 ft bgs because groundwater entered the boring rapidly at 15 ft bgs and very dense material was encountered at 16.5 ft. The results of the March and April 1999 groundwater investigation were submitted to the CSDHS in EC&A's *Monitoring Well Installation/Groundwater Sampling Event/Sensitive Receptor Survey Report* dated September 7, 1999.

Soil samples from each well boring were analyzed for TPHg, BTEX and MTBE. None of the analytes were detected in samples of soil from MW-1, MW-2 or MW-3, at or above the respective reporting limits. Table 5 presents soil sample analytical results. Boring logs for this investigation are included in Appendix A.

August 1999 Sensitive Receptor Survey

In August 1999, EC&A conducted a Sensitive Receptor Survey (SRS) in the site vicinity (Figure 4). The search parameters for the SRS were petroleum vapor receptors within a 250 ft radius of the site,

groundwater plume receptors within 750 ft and municipal wells within one-half mile. The SRS was performed by observation and inspection of properties within the search radius and questioning property owners when possible. No vapor receptors were reported or detected within 250 ft. No water wells were observed by EC&A personnel or identified by property owners. However, based on a conversation with Bob Freeland of the Valley of the Moon Water District, there are two domestic wells within 750 ft of the site, but no municipal wells within one-half mile of the site. The two domestic/irrigation wells are located at 16 and 43/47 West Thompson Avenue. The Valley of the Moon Water District services the area. Additionally, there is a small creek about 75 yards north of the site, which flows to the west. The results of the SRS were transmitted to the CSDHS in EC&A's September 7, 1999, *Monitoring Well Installation/Groundwater Sampling Event/Sensitive Receptor Survey Report*.

May and June 2000 Additional Sensitive Receptor Surveys

On May 8, 2000, EC&A personnel received well log information from the Department of Water Resources (DWR). The DWR identified 40 domestic/water-supply wells within a 2000-ft radius of the site. The only well identified by EC&A that was also reported by the DWR was the domestic well located at 16 West Thompson Avenue.

As a follow-up to receipt of the DWR report, EC&A performed a site and area reconnaissance on June 28, 2000 to observe and document area topography and the location and usage of domestic wells within the vicinity of the site. EC&A's field representative reported that the domestic/irrigation wells at 16 and 43/47 West Thompson Avenue are located approximately 360 ft and 480 ft, respectively, in the downgradient direction from the site (Figure 4).

The water-well located at 16 West Thompson Avenue (DW-1) has a total depth of 100 ft; the casing consists of 8 5/8 inch-diameter steel, and the machine-slotted well screen extends from 50 ft to 75 ft bgs. The filter pack in the well consists of pea gravel from 25 ft to 100 ft bgs. The sanitary seal, which consists of cement, is from 0 ft to 25 ft bgs. It is EC&A's understanding that this well is currently not used for drinking water but, for irrigation and the swimming pool. The log of the 16 West Thompson well is included in Appendix A.

The results of the additional SRS were submitted to the CSDHS in a letter dated October 19, 2000.

June and September 2003 Soil and Groundwater Investigation

To further evaluate the lateral and vertical extent of FHC- and VOC-impacted groundwater in the vicinity of the former USTs, EC&A directed the advancement of one exploratory soil boring, six shallow groundwater monitoring wells and one deep groundwater monitoring well in June and September 2003, and collected soil and groundwater samples for chemical analyses. In June 2003, shallow groundwater monitoring wells MW-4, MW-5 and MW-6 were installed. In September 2003, exploratory soil boring B-7, shallow groundwater monitoring wells MW-7, MW-8 and MW-9, and deep groundwater monitoring well MW-8D were installed.

The original scope of work included the installation of four CPT probes, which were not able to be advanced due to very hard subsurface materials. Consequently, the scope of work was revised to include additional shallow groundwater monitoring wells, a deep groundwater monitoring well and an exploratory soil boring.

Monitoring Well/Boring Installation

On June 18 and 19, 2003, MW-4, MW-5, MW-6 were drilled to 20.5 ft, 21 ft and 22 ft, respectively. Due to the hardness of the subsurface materials encountered, MW-6 was drilled using 4-inch and 6-inch solid-flight augers to a total depth of 22.0 ft. On September 10, 2003, deep well boring MW-8D was advanced to approximately 37.5 ft bgs. Shallow wells MW-8 and MW-9 were installed on September 11, 2003, and shallow well MW-7 and boring B-7 on September 12, 2003. MW-7, MW-8, MW-9 and B-7 were drilled to 21 ft, 20 ft, 21 ft and 21 ft bgs, respectively. Boring and well locations are shown on Figure 3. Boring logs for this investigation are included in Appendix A.

All soil and grab-groundwater samples were analyzed for TPHg and BTEX by Methods SW8015Cm/8021B. Soil samples from a depth of 15 ft in MW-4 and MW-5 and 10.5 ft in MW-6, (MW-4d-15.0, MW-5d-15 and MW-6d-10.5), respectively, were also analyzed for VOCs and oxygenates by Method SW8260B. Soil samples MW-4d-10.0, MW-4d-20.5, MW-6d-5.5, MW-6d-16.0, MW-7d-11.0, MW-8D-11.0, MW-8D-21.0, MW-8D-46.0, MW-9d-16.0 and B-7d-16.0 were also analyzed for HVOCs by Method SW8010. Soils encountered in shallow well MW-8, which was installed near deep well MW-8D, were similar to those in MW-8D; therefore, soil samples were not collected from MW-8. Twelve soil samples and one grab-groundwater sample (from B-7) were submitted for chemical analyses.

TPHg and BTEX were not detected in any of the soil samples. PCE was detected in soil samples from MW-4d-15.0, MW-6d-5.5, MW-6d-10.5, MW-6d-16.0 and MW-9d-16.0 at concentrations ranging from 8.7 micrograms per kilogram ($\mu\text{g/kg}$) in MW-4d-15.0 to 4600 $\mu\text{g/kg}$ in MW-6d-5.5.

PCE at 24 $\mu\text{g/l}$ was the only analyte detected in the grab-groundwater sample from B-7.

Analytical results for soil samples collected from soil borings are in Table 3, analytical results for grab-groundwater samples from borings are presented in Table 4, and soil sample results for monitoring well borings are in Table 5.

April 2005 Soil Gas Survey

The soil gas survey was intended to assess the possibility of another source of PCE and/or other VOCs in the area between MW-6 and MW-9, and establish whether sewer lines have served as a preferential pathway for the migration of VOCs. On April 14 and 15, 2005, EC&A conducted the soil gas survey by advancing 30 pilot holes with an impact hammer, inserting a Gore-Sorber[®] Module into each pilot hole and sealing the hole with a cork. After a module had been in-place for 17 or 18 days, it was withdrawn from the pilot hole, placed in a clean glass vial and sealed with a Teflon-lined cap. The individual module numbers were recorded on a chain-of-custody form and the vials placed in a laboratory-supplied shipping box and transported to W.L. Gore & Associates,

Inc. (Gore) analytical laboratory for chemical analyses. Gore is a state-licensed laboratory in Elkton, Maryland. The pilot holes were filled with neat cement and capped with asphalt or soil, depending on the location.

Soil gas sample analytical results confirmed that there was a release of PCE (and associated degradation products) at the site, there does not appear to be another source of PCE impacting soil and groundwater at the site, and in the site vicinity, sewer lines have served as a preferential pathway for the migration of solvent VOCs.

The TPH and BTEX concentrations detected off-site are probably due to releases from automobiles. The sewer line does not appear to be a significant source of TPH or BTEX impacts. The detection near MW-2 is likely due to the release from the former USTs; the detection in the parking lot in front of the apartment building could be from a release from the former UST or from automobiles.

Analytical Results

One or more of the constituents of FHCs and/or VOCs were detected in sorbers installed on parcels north of the site, and above the Mulford Street and Sierra Drive sewer lines. The sorber installed next to the irrigation well on 16 West Thompson (#90) detected only one analyte, mp-xylene at 0.02 µg (micrograms). A table presenting the sorber analytical data is included in Appendix B.

Significant concentrations of PCE were detected in the two sorbers on the north side of the former dry cleaners and the three sorbers that were placed along the former branch sewer line that passed under Brags Plumbing & Heating, from two sorbers on the west side of the site building, and from the sorber near the former USTs location (Figure 5). This data suggests that PCE was discharged to the sewer beneath the former dry cleaning facility and that there were minor leaks in the line. The highest concentration of PCE was from the sorber above the Mulford Street sewer line that was located next to MW-9. The high concentration in the sorber near MW-9 suggests that there was a significant leak in the sewer line near this location. Three of the seven sorbers above the Sierra Drive sewer line had very low concentrations of PCE.

Trichloroethylene (TCE) was detected in six sorbers, four of which were located above the Mulford Street sewer line. Trace concentrations of TCE were detected at locations along the branch sewer line north of the former dry cleaners.

Cis-1,2-DCE was detected in five sorbers, one along the branch sewer line and the others at locations above the Mulford Street sewer line. Trans-1,2-DCE was detected in three sorbers above the Mulford Street sewer line. Vinyl chloride was detected in two sorbers above the Mulford Street sewer line. 1,1-DCE was detected in one sorber, #76 at 0.05 µg.

TPHg, TPH and/or BTEX compounds were detected in all seven sorbers that were installed above the Mulford Street sewer line, and in four of the seven sorbers that were installed above the Sierra Drive sewer line. Most of these impacts are probably due to releases from automobiles. Significant

concentrations of FHCs were reported from two onsite sorbers: one near MW-2 and one in the parking area in front of the apartment building on the west side of the site.

In the onsite sorbers, the highest concentrations of total-BTEX compounds were reported from the west side of the site. Trace concentrations of total-BTEX were reported from five onsite sorbers. Only trace to low concentrations of total-BTEX were reported from the sorbers installed between the north side of the site and Mulford Street, indicating the site sewer line was not a significant source of BTEX impacts. The highest offsite total-BTEX concentrations were reported from two Mulford Street sorbers. Elsewhere along Mulford Street and Sierra Drive, total-BTEX concentrations ranged from ND<0.02 µg to 0.29 µg. These impacts probably are due to releases from automobiles.

The highest concentrations of TPH and TPHg were reported from the sorber installed near MW-2; this well consistently has reported high concentrations of FHCs. Significant concentrations of TPH and TPHg were detected in a sorber on the west side of the site, the same sorber that reported high concentrations of BTEX compounds. Only trace to low concentrations of TPH and TPHg were reported from two sorbers which were installed between the north side of the site and Mulford Street, indicating the site sewer line was not a significant source of TPH or TPHg impacts.

Significant offsite TPH concentrations were reported from two Mulford Street sorbers. Elsewhere along Mulford Street and Sierra Drive, TPH concentrations ranged from 0.08 µg to 6.41 µg. These impacts probably are due to releases from automobiles. Significant offsite TPHg concentrations were reported from two Mulford Street sorbers. Elsewhere along Mulford Street, TPHg concentrations ranged from 0.15 µg to 3.34 µg. Along Sierra Drive, TPHg concentrations ranged from <0.09 µg to 5.86 µg. These TPHg impacts probably are due to releases from automobiles.

March 2006 Sewer Line Replacement

On March 15-16, 2006, the sewer line serving the site was abandoned and replaced by a new line. The old line was found to be nearly plugged by tree roots. The new line connects with the Mulford Street sewer near MW-8. The locations of both lines are shown on Figure 3.

Soils revealed by the excavation consisted of about 5 ft of clay soil overlying a cemented silty-sand hardpan. The clay-hardpan contact dipped northwest down Mulford Street. Photoionization detector (PID) readings were highest at the clay-hardpan contact (150 to 200 parts-per-million (ppm)). Above the hardpan, PID readings were 1.0 to 20 ppm in the clay soil; within the hardpan, the PID readings were 0.0 to 1.5 ppm, indicating that the hardpan has acted to retard the downward migration of VOCs.

A soil sample collected from the bottom of the clay layer was analyzed by EPA Method 8010: PCE at a concentration of 0.039 mg/kg was detected in this sample (S-1d5.0). Two samples were analyzed from the stock pile: SP-1 had a concentration of 0.011 mg/kg; sample SP-2 was ND<0.005 mg/kg. Approximately 20 cubic yards of impacted soil from the excavation were hauled to the Kettleman Hills landfill for disposal on March 21, 2006.

April 1999 through January 2007 Groundwater Monitoring

All groundwater samples collected during the sampling events were analyzed for TPHg and BTEX (Table 6). Groundwater samples have also been analyzed for MTBE and other oxygenates and the lead scavengers ethylene dibromide (EDB) and 1,2-dichloroethane (1,2-DCA) (Table 7). Since February 2002, the samples from all wells have also been analyzed for VOCs by full scan EPA Method 8260 (Table 8). At EC&A's request, since January 2005, the analytical laboratory subtracted the TPHg-range non-target peaks from the TPH analysis for MW-6 and MW-9 because previous TPH test results for these wells were annotated by the analytical laboratory as "one to a few isolated non-target peaks present," which at this site typically indicates the presence of solvents.

Lateral Extent of FHC Plume In Groundwater

TPHg concentrations ranging from 750 to 17,000 µg/l have been detected in MW-2, which is located about 25 ft southwest of the former location of the USTs. Although high concentrations of TPHg have been detected in MW-6 and MW-9, which are located 50 ft and 165 ft, respectively, down-gradient (northwest) from the former location of the USTs, since January of 2005, modified TPHg analyses have shown that all or almost all of the TPHg detected is due to elevated concentrations of PCE in these two wells. The highest concentrations in the FHC plume, extend between the former location of the USTs and MW-2 (Figure 6).

The lateral extent of FHCs in groundwater is constrained to the north and northwest of the former USTs over-excavation by ND to low concentrations of TPHg and BTEX in samples from B-1 and MW-1, MW-6, MW-7 and MW-8. TPHg concentrations in MW-1 have never been detected above 57 µg/l, and have been below detection limits for all but three events. TPHg has been below detection limits in samples from MW-7 and MW-8 since January 2005, and for at least four events prior to September 2004, when low concentrations of TPHg and BTEX compounds were detected. TPHg has not been detected in samples from MW-6 since January 2005; however, the reporting limit has ranged up to 1700 µg/l. TPHg in MW-6 was ND<50 µg/l in April 2006.

To the west and southwest of the site, the extent of migration of the plume in groundwater is constrained by ND concentrations of TPHg in samples from MW-3 and B-7, and ND to low concentrations in samples from MW-4. TPHg has not been detected in samples from MW-3 for the last sixteen consecutive events, and low levels of BTEX were detected in only two (September 2004 and April 2006) of the last sixteen sampling events. In MW-4, TPHg and/or BTEX compounds have been detected, at minor concentrations, for five of the fourteen events conducted to date.

The southern extent of migration of the FHCs plume is identified by ND concentrations of TPHg in samples from MW-5, which is cross-gradient of the former USTs excavation. TPHg has only been detected once, at a low concentration, in MW-5; minor levels of BTEX compounds have been detected four times. The southeastern limit of the FHCs plume is identified by B-4. Samples from this boring were ND for TPHg and BTEX in November 1997.

The lateral extent of FHCs migration in groundwater to the east beneath Sonoma Highway is not known because the presence of numerous underground utilities east of the former location of the

USTs prevented drilling a soil boring in this area. However, it is not likely that FHCs in groundwater have migrated into the underground utility trenches east of the former USTs location because the minimum measured depth to groundwater in MW-1 (7.32 ft) appears to be too great to have entered the trenches. It is unlikely that FHCs in groundwater extend more than 30 ft to the east.

Lateral Extent of the PCE Plume

The southern limit of the PCE plume in groundwater is near MW-5, where it has only been detected in samples from three of fifteen sampling events (3.5 µg/l maximum) (Figure 7). The eastern limit of the PCE plume probably extends a short distance past MW-1, which had 56 µg/l PCE in January 2007. To the north, the limit of the PCE plume is near MW-7, which had 8.5 µg/l PCE in January 2007. Onsite, to the west of the former UST excavation, the limit of the PCE plume is very near to MW-3, which had a concentration of PCE at 3.4 µg/l in January 2007. To the southwest, the plume extends a short distance past MW-4, which had a PCE concentration of 26 µg/l in January 2007.

The PCE concentration-gradient in the 117-ft distance between MW-6 and MW-9 is considered to be anomalous. The respective concentrations in MW-6 and MW-9 were 39,000 µg/l and 35,000 µg/l in July 2006; similar concentrations were reported in both wells in previous sampling events. In January 2007, the PCE concentrations dropped to 19,000 µg/l and 18,000 µg/l, respectively. Possible explanations for the anomalous concentration-gradient include a leak in the sewer beneath Mulford Street, or another PCE source near MW-9. In MW-2 and MW-6, the PCE concentration generally increases as the groundwater level drops, and decreases as the water level rises.

The TCE plume probably is similar to the PCE plume, except that the concentrations are much lower. The maximum concentration of TCE detected to date is 85 µg/l (MW-2, January 2005). Higher concentrations of TCE may be present in MW-6 and MW-9, but the high TCE reporting limits in these wells (100 µg/l to 1000 µg/l) has obscured the likely presence of this compound.

The source of the EDB detected in the offsite water supply well DW-1 (16 West Thompson Avenue) is unknown. EDB has not been detected at the site.

1,2-DCA Plume

1,2-DCA has only been detected in one monitoring well, MW-2, which had a maximum concentration of 440 µg/l (July 2006). Although 1,2-DCA concentrations have fluctuated significantly, the maximum values have increased over time.

Vertical Extent of Impacted Groundwater

FHCs have only been detected four times in deep well MW-8D, all at relatively low concentrations. DTW when the FHCs were detected ranged from 12.50 ft to 21.16 ft - see Table 6.

PCE has been detected twice in MW-8D at a maximum concentration of 1.4 µg/l. Low concentration of n-propyl benzene and naphthalene have been detected once; a low concentration of 1,3,5-trimethylbenzene has been detected twice; and low concentrations of 1,2,4-trimethylbenzene have been detected three times.

HYDROGEOLOGY

Review of the logs of seven soil borings and nine monitoring wells drilled to date at the site indicate that about 4 to 5 ft of fill and clayey soil overlie partially cemented, very dense silty-sand and hard sandy-silt with significant gravel content in some intervals. The cemented deposits are mapped as Older Alluvium on the *Geologic Map of the Sonoma 7.5' Quadrangle, Sonoma and Napa Counties, California: a Digital Database: Version 1.0*, by David L. Wagner, Kevin B. Clahan, Carolyn E. Randolph-Loar and Janet M. Sowers (California Geological Survey 2004, scale 1/24,000). Rhyolitic lava of the Sonoma Volcanics is exposed to the east of Highway 12 and probably is present at a shallow depth beneath the site. Logs of the soil and well borings drilled to date are in Appendix A.

Although the well and soil boring logs indicate that saturated-zone soils largely consist of fine-grained aquitard materials, thin gravel or sand beds are probably present that could serve as pathways for contaminant migration. For example, B-6, which is 37 ft northwest of the former location of the USTs, penetrated a shallow gravel bed from 7 ft to 7.5 ft bgs, i.e., just above the top of groundwater during seasonal high water.

Fine-grained sandy materials extend to at least 46 ft bgs, the maximum depth explored in MW-8D; very dark gray sandy-clay was encountered from about 41.5 ft to 46 ft bgs in this boring.

Groundwater

What appeared to be perched water was encountered at about 5 ft bgs in artificial fill in MW-2, MW-3 and MW-6. Groundwater was encountered from 15 ft to 16.5 ft bgs in the borings for MW-1, MW-2, MW-3, MW-5, MW-6 and MW-7. In MW-4, MW-8D and MW-9, groundwater was encountered from 10 ft to 11 ft bgs.

In November 1997, groundwater was initially encountered in B-1 at 20 ft bgs in very dense silty-sand; in B-2 at 23 ft bgs in very dense silty-sand; in B-3 at 21.5 ft bgs in very dense silty-sand; in B-4 at 15.5 ft bgs in very dense silty-sand; in B-5 at 15.5 ft bgs in a gravel lense in very dense silty-sand; and in B-6 at 20.5 ft bgs in very dense silty-sand. Groundwater entered the borings slowly. The borings were not open for sufficient time for the groundwater to equilibrate.

In March 1999, groundwater entered the boring for MW-1 very slowly at 16 ft bgs in very dense gravelly-sand. Groundwater entered rapidly in MW-2 at 15 ft bgs in very dense silty-sand, and rapidly in MW-3 at 16 ft bgs in very hard sandy-silt.

In June 2003, groundwater was encountered at 10 ft bgs in MW-4 in a very dense, wet silty-sand; and at 15 ft bgs in MW-5 and MW-6 in hard sandy-silt. In September 2003, groundwater was encountered at 15 ft bgs in MW-7 in dense silty-sand, in MW-8 and MW-8D at 10 ft bgs in hard sandy-silt, in MW-9 at 11 ft bgs in very stiff silty-sand, and in B-7 at 16.5 ft bgs in very stiff sandy-silt.

A downward hydraulic gradient has generally been present in the MW-8/MW-8D well pair since they were installed in September 2003. The difference was -0.26 ft in September 2003, -0.02 ft in December 2003, -3.72 ft in March 2004, +0.61 ft in June 2004, -4.70 ft in September 2004, -10.37 ft in January 2005, -9.90 ft in April 2005, -11.01 ft in July 2005, -12.61 ft in October 2005, -17.71 ft in January 2006, -7.53 ft in April 2006, -14.24 ft in July 2006, -7.26 ft in October 2006, and -11.69 ft in January 2007. Groundwater elevations and gradients are presented in Table 9. The cause of the general increase in head difference in the MW-8/8D well pair since September 2003 is unknown.

Groundwater-flow Direction

Surface topography indicates that the local groundwater-flow direction is toward the northwest. Water-level data from the sample events indicates that the site groundwater-flow direction typically is to the west to northwest, consistent with that indicated by the surface topography. The groundwater gradient for all but three monitoring events have been in a range from N28°W to N83°W (Figure 8).

ASSESSMENT OF FHC- AND VOC-IMPACTED SOIL AND GROUNDWATER

Soil

Soil sample analytical results are presented in Tables 1, 2, 3 and 5. Figure 9, 10 and 11 show soil sample analytical results and isoconcentration contours for TPHg and benzene.

FHCs

Analytical results from soil samples collected from the excavation and borings, including those that were converted to monitoring wells, are in Tables 1, 2, 3 and 5. These results indicate that residual FHC-impacted soil is primarily west and northwest of the location of the former USTs. Soil sample P-3, collected at 8 ft bgs in the west wall of the UST excavation, contained concentrations of TPHg and benzene at 1600 mg/kg and 1100 µg/kg, respectively.

To the north, the lateral extent of migration of FHCs in soil is between B-1 and B-2. B-1, located 30 ft north of the former UST excavation, was ND for all FHCs analytes. Twelve feet north of the former excavation, the sample collected from B-2 at 10.5 ft bgs contained TPHg at 600 mg/kg; benzene was not detected above the reporting limit.

To the west, FHCs are estimated to have migrated about 20 ft in soil beneath the building. Very low concentrations of TPHg (1.5 mg/kg) and trace concentrations of BTEX were detected in the 11-ft bgs sample from B-5, which is located about 16 ft southwest of the former location of the USTs. The 16-ft bgs sample from B-5 was ND for all analytes. No analytes were detected in the sample(s) from B-6, which was drilled inside the former dry cleaning facility.

B-3, which is located about 4 ft south of the former UST excavation, had low concentrations of benzene and ethylbenzene. This boring appears to be close to the southern extent of FHCs-impacted soil.

Soil sample P-5, collected from the east wall of the former UST excavation at 10 ft bgs, appears to define the eastern extent of FHCs-impacted soil. Only low concentrations of FHCs were detected in this sample.

The vertical extent of FHC-impacted soil is about 15 ft to 20 ft bgs. In P-2, the 14-ft sample from the floor of the USTs excavation had low concentrations of TPHg and BTEX compounds. No FHCs were detected in any of the 21-ft bgs soil samples from the six borings. Trace concentrations of BTEX compounds were detected in the samples from 16-ft bgs in B-2 and B-3.

No FHCs were detected in the soil samples from the monitoring well borings.

VOCs

Soil samples from wells and borings collected prior to February 2002 were not analyzed for VOCs. It is likely that PCE and its derivative compounds are present in the soil beneath the 18460 Sonoma Highway building, because high concentrations were detected in samples from MW-6, which is located only about 8 ft north of the building. In this well, 4600 µg/kg PCE was detected in the vadose-zone sample from 5.5 ft bgs, and 2600 µg/kg in the saturated-zone sample from 10.5 ft bgs.

Elsewhere, a concentration of 820 µg/kg PCE was detected in a sample from 16 ft bgs in MW-9, which is located 115 ft downgradient of MW-6. Although the holding time had been exceeded, the 6-ft bgs sample from MW-9 was analyzed to assess the possibility of PCE having been released to the ground surface at this location; none was detected. A low concentration of PCE (8.7 µg/kg) was detected in the sample from 15 ft bgs in MW-4, which is located at the southwest corner of the site - see Figure 9. VOCs were not detected in soil samples from MW-5, MW-7 and MW-8D.

In March 2006, 39 µg/kg PCE was detected at 5 ft bgs in the excavation for the new sewer line on the parcel north of the site. This sample was collected just above the contact of native clayey soil with the underlying hardpan.

Groundwater

Lateral Extent of FHCs-impacted Groundwater

TPHg concentrations up to 17000 µg/l have been detected in samples of groundwater from MW-2, which is about 25 ft southwest of the location of the former USTs. Although high concentrations (>1000 µg/l) TPHg have been detected in the past in MW-6 and MW-9, which are located 50 ft and 170 ft, respectively, down-gradient (northwest) from the location of the former USTs, it is likely that only low concentrations of TPHg are actually present, and that the majority of the TPHg reported is due to elevated concentrations of PCE. The most significant concentrations of FHCs in groundwater are in the plume that extends northwest from the location of the former USTs and MW-2.

The lateral extent of FHC-impacted groundwater appears to be defined to the north of the former UST excavation by B-1. To the northwest, the lateral and vertical extent of the plume are defined by MW-1, MW-7, MW-8 and MW-8D (Figure 6). TPHg has mostly been below detection limits in

samples from these wells since January 2005 and for at least four events prior to September 2004, when low concentrations of TPHg and BTEX were detected. In January 2007, minor concentrations of TPHg were detected in the sample from MW-1 (57 µg/l) and MW-8D (68 µg/l).

On the west side of the site, the extent of the FHC plume in groundwater appears to be defined by low to ND concentrations of TPHg in samples from MW-3 since January 2003, low to ND concentrations in samples from MW-4 (maximum of 86 µg/l), and ND concentrations in the sample from B-7 in September 2003. TPHg has not been detected in samples from MW-3 for the last nine consecutive events, and low levels of BTEX were detected in only one sample (September 2004) from the last nine consecutive sampling events.

The southeastern limit of the FHC plume is defined by B-4. The sample from this boring was ND for TPHg and BTEX in November 1997. The southern extent of the FHC plume appears to be defined by ND results in samples from MW-5 since January 2005. This well is up-gradient of the location of the former USTs (Figures 6 and 8).

The lateral extent of FHCs in groundwater to the east beneath Sonoma Highway is not defined, because the numerous underground utilities prevented drilling in this area. However, it is not likely that FHCs in groundwater have migrated into the underground utility trenches east of the former UST excavation because the minimum measured depth to groundwater in MW-1 (7.32 ft, April 2006) appears to be too great to have entered the trenches. It is not likely that FHCs have migrated in groundwater farther than about 30 ft to the east.

Lateral Extent of VOC-impacted Groundwater

One or more of the solvents/de-greasers PCE and TCE and their degradation product cis-1,2-DCE have been detected in samples from all monitoring wells except MW-5. In January 2007, the highest concentrations of PCE were detected in samples from MW-6 and MW-9 at 19,000 µg/l and 18,000 µg/l, respectively.

To the south, the extent of the PCE plume is identified by the low (3.5 µg/l, maximum) to ND concentrations detected in samples from MW-5. To the north the limit of the plume is near MW-7, which had a maximum concentration of 8.5 µg/l on January 2007 - see Figure 7. Onsite, to the west of the former UST excavation, the limit of the PCE plume is a short distance west of B-7, which had 24 µg/l PCE in September 2003.

The PCE plume extends farther to the southwest in the vicinity of MW-4, which had a PCE concentration of 26 µg/l in January 2007. PCE was detected twice in deep well MW-8D, located down-gradient of the former UST excavation, at a maximum concentration of 1.4 µg/l in April 2006. In the last three monitoring episodes, PCE was ND in the sample from MW-8D.

The PCE concentration-gradient in the 117-ft distance between MW-6 and MW-9 is considered to be anomalous. The respective concentrations in MW-6 and MW-9 were 19,000 µg/l and 18,000 µg/l, respectively, in January 2007. Similar concentrations were detected in groundwater from both

wells in previous sampling events. The most likely explanation is a leak in the sewer beneath Mulford Street.

The TCE plume is similar to the PCE plume, except that the concentrations are much lower and ND results were reported from B-7 and MW-7.

Vertical Extent of Impacted Groundwater

In samples from MW-8D, FHCs have only been detected six times. In September 2004, when historically low groundwater elevations were recorded in the shallow water table, TPHg at 110 µg/l and benzene at 3.2 µg/l were detected - see Table 1. Similar results were reported in September 2004 in shallow well MW-8, which is located next to MW-8D.

Comparison between solvent VOC analytical results for MW-8 and MW-8D indicates that the impact to the deeper water producing zone is minor.

Water-supply Well

In all but one monitoring event, groundwater samples from DW-1 at 16 West Thompson Avenue contained minor concentrations of PCE and EDB. The sample collected in January 2005 was ND for EDB. The analytical laboratory was unable to analyze the sample collected in July 2005 for PCE. Analytical results from DW-1 are presented in Table 10.

ESTIMATE OF REMAINING MASS OF FHCs IN SOIL

The mass of TPHg and benzene remaining in the soil were calculated by creating isoconcentration contour maps of these materials, using the maximum concentrations measured in each boring and then estimating the volume of impacted soil within each contour interval (Figures 9 and 10). The average concentration of FHCs within each contour interval was assumed to be one half of the value of the higher contour. For the area within the highest contour, the sample with the maximum concentration measured to-date was used for the average concentration. The thickness of the contaminated zone was assumed to be 10 ft, and the entire zone was assumed to have the average concentration. The results of the calculations of TPHg and benzene in soil are presented in Table 11.

TPHg

The results of the calculations show that approximately 1380 kilograms (kg) of TPHg remain in soil at the site.

Benzene

The results of the calculations show that approximately 1.9 kilograms (kg) of benzene remain in the soil at the site.

The mass of TPHg and benzene remaining in groundwater were not calculated because, in EC&A's experience, this mass is extremely small.

RISK ASSESSMENT

Chemical Identification

The chemicals at the site that pose a potential risk to human health and the environment are those associated with gasoline. A petroleum distillate, gasoline is a complex mixture of hydrocarbons in the range of C4 to C12. Gasoline contains a mixture of substances that are listed as toxic pollutants pursuant to 40 CFR 122.21, Appendix B, Tables II/III/IV, and known to the State of California to cause cancer, birth defects, and other reproductive harm. Benzene is considered the most toxic component of gasoline. Benzene was detected at high concentrations in MW-2 (up to 1800 µg/l), which is about 30 ft cross gradient from the former location of the USTs. 1,2-DCA, a lead scavenger, is also found at a high concentration in MW-2 (up to 440 µg/l).

PCE is a solvent/degreaser that was commonly used by dry cleaning establishments. Although small amounts of this substance are pervasive in soil on and near the site, high concentrations have only been identified in groundwater from MW-6 (up to 39,000 µg/l) and offsite well MW-9 (up to 35,000 µg/l).

Soil Remediation Goals

The proposed remediation goals for soil are as follows:

- Gasoline (TPHg): 100 mg/kg based on the SFBRWQCB risk-based screening level of 100 mg/kg for residential-land surface soil where groundwater is a current or potential source of drinking water.
- Benzene: 0.045 mg/kg based on the SFBRWQCB risk-based screening level of 0.045 mg/kg for residential-land surface soil where groundwater is a current or potential source of drinking water.
- Toluene: 2.9 mg/kg based on the SFBRWQCB ESL of 2.9 mg/kg for toluene in shallow soil where groundwater is a current or potential source of drinking water.
- Ethylbenzene: 3.3 mg/kg based on the SFBRWQCB ESL of 3.3 mg/kg for ethylbenzene in shallow soil where groundwater is a current or potential source of drinking water.
- Xylenes: 2.3 mg/kg based on the SFBRWQCB ESL of 2.3 mg/kg for xylenes in shallow soil where groundwater is a current or potential source of drinking water.
- 1,2-DCA: 0.0045 mg/kg based on the SFBRWQCB risk-based screening level of 0.0045 mg/kg for residential-land surface soil where groundwater is a current or potential source of drinking water.

Groundwater Remediation Goals

The proposed remediation goals for groundwater are as follows:

- Gasoline (TPHg): 100 µg/l based on the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) risk-based screening level of 100 µg/l for residential-land surface soil where groundwater is a current or potential source of drinking water.
- Benzene: 1.0 µg/l based on the SFBRWQCB risk-based screening level of 1.0 µg/l for residential-land surface soil where groundwater is a current or potential source of drinking water.
- Toluene: 40 µg/l based on the SFBRWQCB ESL of 40 µg/l for toluene where groundwater is a current or potential source of drinking water.
- Ethylbenzene: 30 µg/l based on the SFBRWQCB ESL of 30 µg/l for ethylbenzene where groundwater is a current or potential source of drinking water.
- Xylenes: 20 µg/l based on the SFBRWQCB ESL of 20 µg/l for xylenes where groundwater is a current or potential source of drinking water.
- 1,2-DCA: 0.5 µg/l based on the SFBRWQCB risk-based screening level of 0.5 µg/l for residential-land surface soil where groundwater is a current or potential source of drinking water.

Potential Exposure Pathways

Underground Utilities

Numerous underground utilities are present under and near the site (Figure 3). There are telephone, water, electrical and gas lines between the former UST location and Sonoma Highway, and along the southeastern property line. It is not likely that FHC-contaminated groundwater has migrated into the underground utility trenches near the former USTs because the minimum measured depths to groundwater in MW-1 (7.32 ft, April 2006) and MW-2 (7.48 ft, April 2006) appear to be too great to have entered the utility trenches.

An abandoned sewer line follows the north side of the site building, then trends northwest to reach the sewer line beneath Mulford Street (Figure 3). The old line was abandoned in March 2006 because it was clogged with tree roots and re-routed outside of the footprint of the Braggs Plumbing & Heating building. There also is a buried electrical line between the site building and Braggs Plumbing & Heating.

Buildings/Ground Surface

All the buildings in the site vicinity appear to be constructed on concrete slab foundations. PCE appears to have entered the abandoned sewer line on the north side of the site through a drain in the floor (Figure 3).

Sensitive Receptors

According to the Valley of the Moon Water District, there are two domestic wells within 750 ft of the site, and no municipal wells within one-half mile. The domestic/irrigation wells are located at 16, 43/47 West Thompson Avenue. The Valley of the Moon Water District services the area. Additionally, there is a small creek, located about 75 yards north of the site, that flows to the west.

FEASIBILITY STUDY AND REMEDIAL OPTION SELECTION

The following four remedial options were assessed for their potential technical feasibility:

1. Passive Bioremediation and Groundwater Monitoring
2. Soil Excavation
3. High-vacuum Dual-phase Extraction
4. Ozone Microsparging with Hydrogen Peroxide Injection

Option 1: Natural Attenuation and Groundwater Monitoring

This option minimizes remediation cost by leaving the FHCs in soil and groundwater in-place, and monitoring groundwater conditions quarterly to confirm that the FHCs concentrations are stable or declining. The sampling frequency would typically be reduced to twice a year; once each, in the wet and dry seasons. The time-frame for monitoring is unknown. The costs for this option are estimated to be about \$7,800.00 per year.

Option 2: Soil Excavation

This option removes source material and impacted groundwater, if present in sufficient quantity to pump from the excavation, in a short time-frame. In 1995, approximately 60 cu yds of FHCs-impacted soil were excavated from the vicinity of the remaining portions of the USTs that underlie the building. However, FHCs remained in soil on the north side (1300 mg/kg) and west (building) side (1600 mg/kg) of the excavation. The impacted soil beneath the building could not be removed. To fully implement this option, the site building would have to be demolished. Additionally, because site bedrock is hard, heavy duty excavation equipment would be needed to complete this work.

Considerable source reduction could be accomplished by removing the impacted soil to the north of the 1995 excavation. Twelve feet north of the excavation, in B-2, TPHg was detected at 600 mg/kg at 10.5 ft bgs, and benzene at 0.058 mg/kg; organic vapors were detected at 500 ppm at 15 ft bgs. The proposed excavated area would be 10 ft wide by 20 ft long and up to 15 ft deep (111 in-place cubic yards). The actual depth would depend on FHCs concentrations and the hardness of the native materials encountered. Although implementation of this option would not be sufficient to remediate the entire site, it could be conducted in concert with another option. The estimated cost for this option is \$40,500.00. If groundwater enters the open excavation in sufficient quantities to extract, there will also be costs for water disposal.

Option 3: High-Vacuum Dual Phase Extraction

High-vacuum dual-phase extraction (HVDPE), also known as multi-phase extraction or vacuum-enhanced extraction, is a technology that uses a high-vacuum system to remove various combinations of contaminated groundwater, separate-phase petroleum product, and hydrocarbons vapor from the subsurface, including low-permeability or heterogeneous formations. Extracted liquids and vapor are treated and collected for disposal. Extraction wells are installed at approximately 20-ft intervals within the source area. The extraction wells are screened in the zone

of contaminated soils and groundwater, allowing removal of contaminants from above and below the water table. The system lowers the water table around the wells, exposing more of the formation. Contaminants in the newly exposed vadose zone are then accessible to vapor extraction. Once above ground, the extracted vapors or liquid-phase organics and groundwater are separated and treated.

The extracted vapors are burned, either by a catalytic converter or by a thermal oxidizer unit. Extracted groundwater is treated by use of air sparging and heating while under high vacuum in the inlet tank. The process-treated water is then transferred to a secondary treatment system, which consists of at least two carbon canisters in series. It is expected that contaminated groundwater removal at the rate of up to approximately two to seven gallons per minute may occur, which will be treated and discharged to a temporary storage tank for disposal either by hauling to a disposal facility or discharge to a sanitary sewer.

A major limitation on using the HVDPE option on the site is the potential to produce hydrochloric acid (HCl) by passing PCE through the thermal oxidizer. This process not only would damage the HVDPE system, it also poses a serious health safety problem due to exposure to HCL vapors. If HCL vapors are produced, they would have to be treated by passing them through a specially designed treatment system that would significantly increase the cost of this option.

Initially, EC&A recommends conducting slug tests on selected site monitoring wells and an 8-hour HVDPE pilot test on MW-2. The objectives of this preliminary test would be to assess vapor yields from the formation and the potential for PCE vapors to migrate into the south side of the site building:

If the results of the slug tests and the pilot test on MW-2 are favorable, EC&A recommends conducting a fifteen-day HVDPE pilot test in the area near the former USTs to assess the suitability of this option for site remediation. Substantive concentrations of FHCs remain in soil beneath the building because it was inaccessible to excavate. The primary goal of the pilot test would be to evaluate the effectiveness of this option to complete the remediation of FHCs at this site. The goals for this test would be to:

- 1) Evaluate the radius of influence of the HVDPE system wells,
- 2) Establish the quantity of FHCs that can be extracted by the HVDPE system, and
- 3) Assess the potential for PCE vapors to migrate into the extraction wells. This data would be intended to establish the effectiveness of this option for remediation of FHCs at the site.

The cost of the pilot test, including installation of three wells, would be approximately \$90,000.00.

Option 4 - Ozone Microsparging with Hydrogen Peroxide

Ozone sparging is a process where ozone is introduced into groundwater through a specially designed sparge point. As these ozone bubbles rise within the column of water, they strip VOCs and

FHCs from the groundwater. Low flow-rates (2-6 cfm) are used. Upon entering the microbubbles, the VOCs are rapidly oxidized to carbon dioxide and water. Any ozone not consumed in direct reaction with hydrocarbons rapidly decomposes to oxygen. This process has an added benefit of naturally stimulating biological degradation of the FHCs. Groundwater and vapors are not extracted from the subsurface, so no waste disposal is required.

The injection of hydrogen peroxide enhances the oxidation process by reacting with the ozone in the saturated zone, which encourages the formation of hydroxyl radicals and dissolved oxygen. The hydrogen peroxide is injected directly above the ozone sparge points to facilitate mixing, increasing the overall oxidation process and the destruction of FHCs. In addition, hydrogen peroxide acts as a strong surfactant in the substrate, enhancing the stripping and desorbing of FHCs from the smear zone. This process is intensified by the formation of hydroxyl radicals (OH) that effectively and efficiently break down organic contaminants into water and carbon dioxide. Additionally, iron acts as a catalyst that enhances the hydroxyl radical reaction. This reaction is beneficial, because the dissolved TPHg present in the groundwater have relatively high reaction-rate constants with the hydroxyl radical and are readily susceptible to breakdown through this process. The air and hydrogen peroxide injection will typically result in a significant increase in dissolved oxygen within the injection area, promoting aerobic bioremediation.

A disadvantage to this process is that it will not directly remediate the residual soil contamination that may be present in vadose-zone soils. As a result, groundwater infiltration via rain fall would most likely continue to impact groundwater.

If subsurface conditions are favorable for injection, ozone and hydrogen peroxide injection could effectively remediate TPHg, benzene and 1,2-DCA impacted areas in soil below the water table. Previous experience with this method indicates that FHCs in groundwater decrease to closure levels within two to three years at eighty percent of the sites. Additionally, this method significantly reduces waste soil and water requiring disposal.

However, because the suitability of the hard subsurface material for ozone injection is uncertain, EC&A recommends a three-month pilot test to evaluate the suitability of ozone injection. Three injection wells would be installed to approximately 30 ft bgs within the sand/silt unit (Figure 2). The pilot test would be conducted using a PulseOx 100 ozone/hydrogen peroxide system supplied by Applied Process Technology, Inc. (APT) of Pleasanton California. The APT system is a compact unit consisting of a weather-resistant cabinet with UL-rated parts, an enclosed ozone generator, an oxygen generator, and a 60-gallon, double-walled tank for the hydrogen peroxide. The system is weather resistant and air cooled by factory-installed fans. The sparge wells are supplied by an ozone generator equipped to supply up to 23 scfh at 95% oxygen and deliver up to 2 pounds of ozone and 12 gallons per day of 7% hydrogen peroxide solution. System electrical requirements include two 115-volt, single-phase, 60-Hz (15/20 amp) services for the ozone and hydrogen peroxide system, fan assembly and general electrical outlet requirements. The system would be housed in an enclosure constructed with a locking gate.

The cost of the three month pilot test is estimated to be approximately \$26,000.00.

CORRECTIVE ACTION RECOMMENDATION

Option 1 is rejected because it will not adequately address the residual FHCs-impacted soil remaining in the vicinity of the former USTs, extended groundwater monitoring would be required. Since groundwater monitoring began in MW-2 in February 2002, FHC concentrations in MW-2 have not decreased significantly or demonstrated a decreasing trend. Consequently, the time frame for groundwater quality to meet SFBRWQCB objectives by natural attenuation would be unacceptable.

Option 2 is rejected because it would require destruction of the southeast section of the commercial building, although a limited excavation on the east side of the building may be warranted in order to accelerate the remediation process.

Options 3 and 4 are recommended; however, pilot tests are recommended for these Options before choosing one (or both) of the options. HVDPE would be useful to reduce the high concentrations of FHCs remaining in soil beneath the building in the vadose zone and near the location of the former USTs. Lowering the concentrations of TPHg and BTEX in soil would dramatically reduce the time needed for ozone sparging with hydrogen peroxide injection to remediate the site.

For Option 3, slug tests should be performed on selected site monitoring wells, and an 8 hour HVDPE pilot test should be performed on MW-2. If the results of these initial tests are favorable, three 4-inch diameter extraction wells should be installed at locations near MW-2 and near the southeast corner of the building, and a fifteen day HVDPE pilot test performed.

For Option 4, three injection wells would be installed to approximately 30 ft bgs within the sand/silt unit (Figure 2). The pilot test would be conducted using a PulseOx 100 ozone/hydrogen peroxide system and last for three months.

SCHEDULE

Assuming the CSDHS concurs with EC&A's recommendation for pilot tests for Options 3 and 4, EC&A will prepare a workplan to implement the pilot tests. Completion of the workplan will take approximately eight weeks following approval of the FS/CAP by the CSDHS. EC&A anticipates that the initial three ozone sparge wells will be installed within one month following the receipt of approval of the workplan from the CSDHS and acquisition of the required drilling permits. The HVDPE extraction wells will be installed only if the slug tests and the 8-hour pilot test prove favorable.

Following the completion of the pilot tests and evaluation of the data generated from the pilot tests, EC&A will prepare a remedial action plan to implement the most effective remediation option(s).

LIMITATIONS

The conclusions presented in this document are professional opinions based on the data presented in this document, including data generated by others. Whereas EC&A does not guarantee the accuracy of information supplied by third parties, we reserve the right to use this information in formulating our professional opinions. They are intended only for the indicated purpose and project site. Conclusions and recommendations presented herein apply to site conditions existing at the time of our study. Changes in the conditions of the site property can occur with time because of natural processes or the works of man on the site or adjacent properties. Changes in applicable standards can also occur as the result of legislation or from the broadening of knowledge. Accordingly, the findings of this document may be invalidated, wholly or in part, by changes beyond our control.

Thank for you for the opportunity to provide environmental services for you. Please call John Calomiris, project manager, if you have any questions.

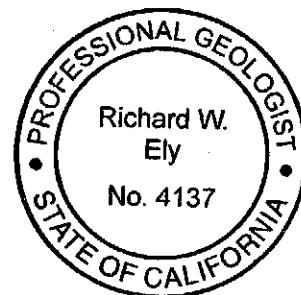
Sincerely,

John Calomiris

John Calomiris
Technical Operations Manager

Richard Ely

Richard Ely, R.G. #4137
Senior Geologist



Attachments: Figure 1 - Site Location Map
Figure 2 - Site Area Map
Figure 3 - Site Plan
Figure 4 - Sensitive Receptor Survey Map
Figure 5 - PCE in Soil Gas Isoconcentration Contour Map
Figure 6 - TPHg in Groundwater Isoconcentration Map, 09 January 2007
Figure 7 - PCE in Groundwater Isoconcentration Map, 09 January 2007
Figure 8 - Groundwater Elevation Map, 09 January 2007
Figure 9 - Soil Sample Analytical Results
Figure 10 - Isoconcentration Contour Map of TPHg in Soil
Figure 11 - Isoconcentration Contour Map of Benzene in Soil

Table 1 - Analytical Results - Soil and Groundwater Samples from UST Removal
Table 2 - Analytical Results - Soil Samples from Over-excavation
Table 3 - Analytical Results - Soil Samples from Borings
Table 4 - Analytical Results - Grab-groundwater Samples from Borings
Table 5 - Analytical Results - Soil Samples from Monitoring Well Borings
Table 6 - Analytical Results - Groundwater Samples from Monitoring Wells: FHCs
Table 7 - Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers

Table 8 - Analytical Results - Groundwater Samples from Monitoring Wells: VOCs

Table 9 - Groundwater Elevation Data

Table 10 - Analytical Results - Groundwater Samples from Water-supply Well:
FHCs, MTBE, Other Oxygenates, Lead Scavengers and VOCs

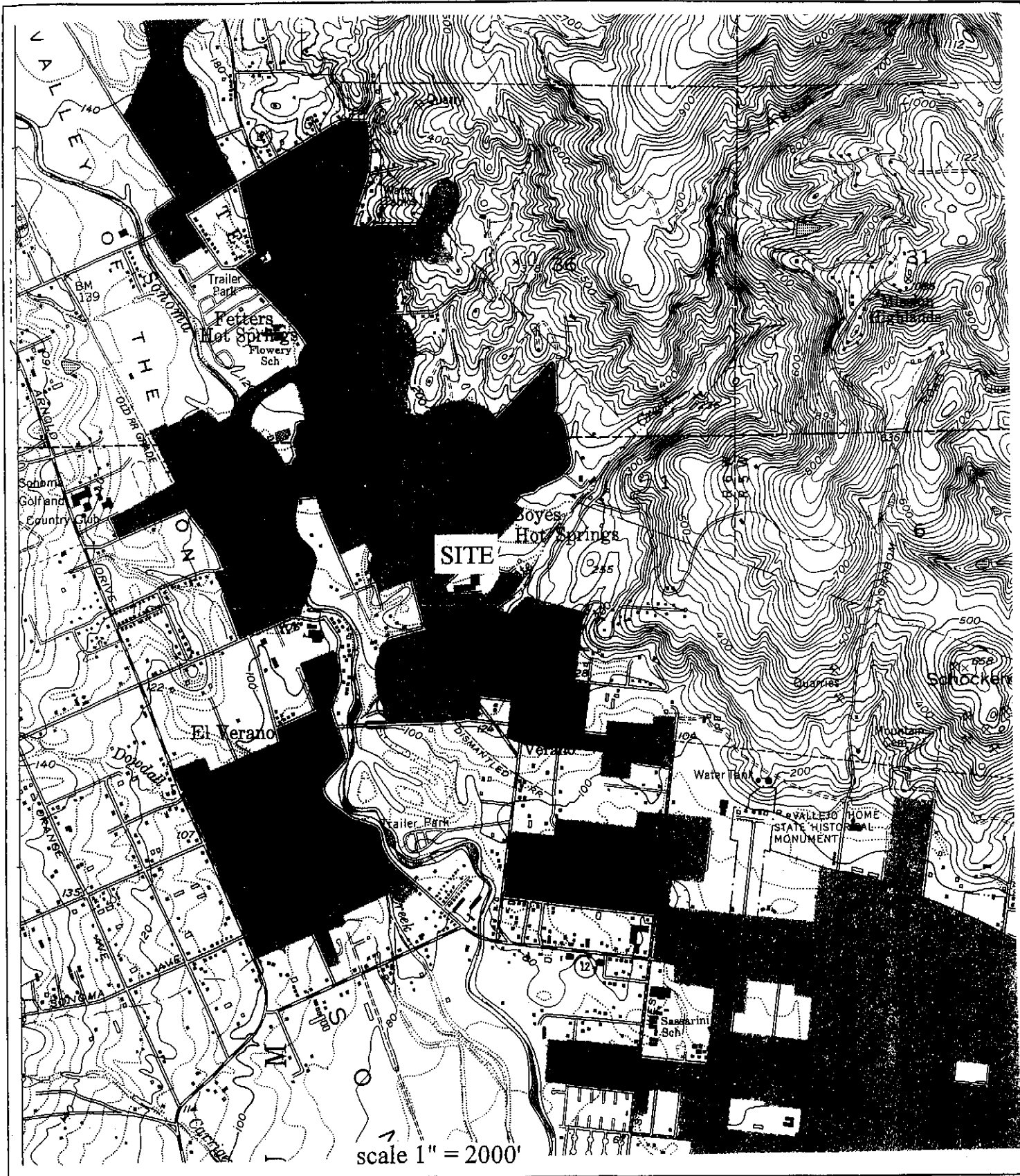
Table 11 - Estimated Mass of FHCs Remaining in Soil

Appendix A - Soil & Well Boring Logs

Appendix B - Gore-Sorber® Analytical Data

cc: Dale Radford, County of Sonoma Department of Health Services

0268\2007 FS-CAP



EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

Site Location Map
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE
1

JOB NUMBER

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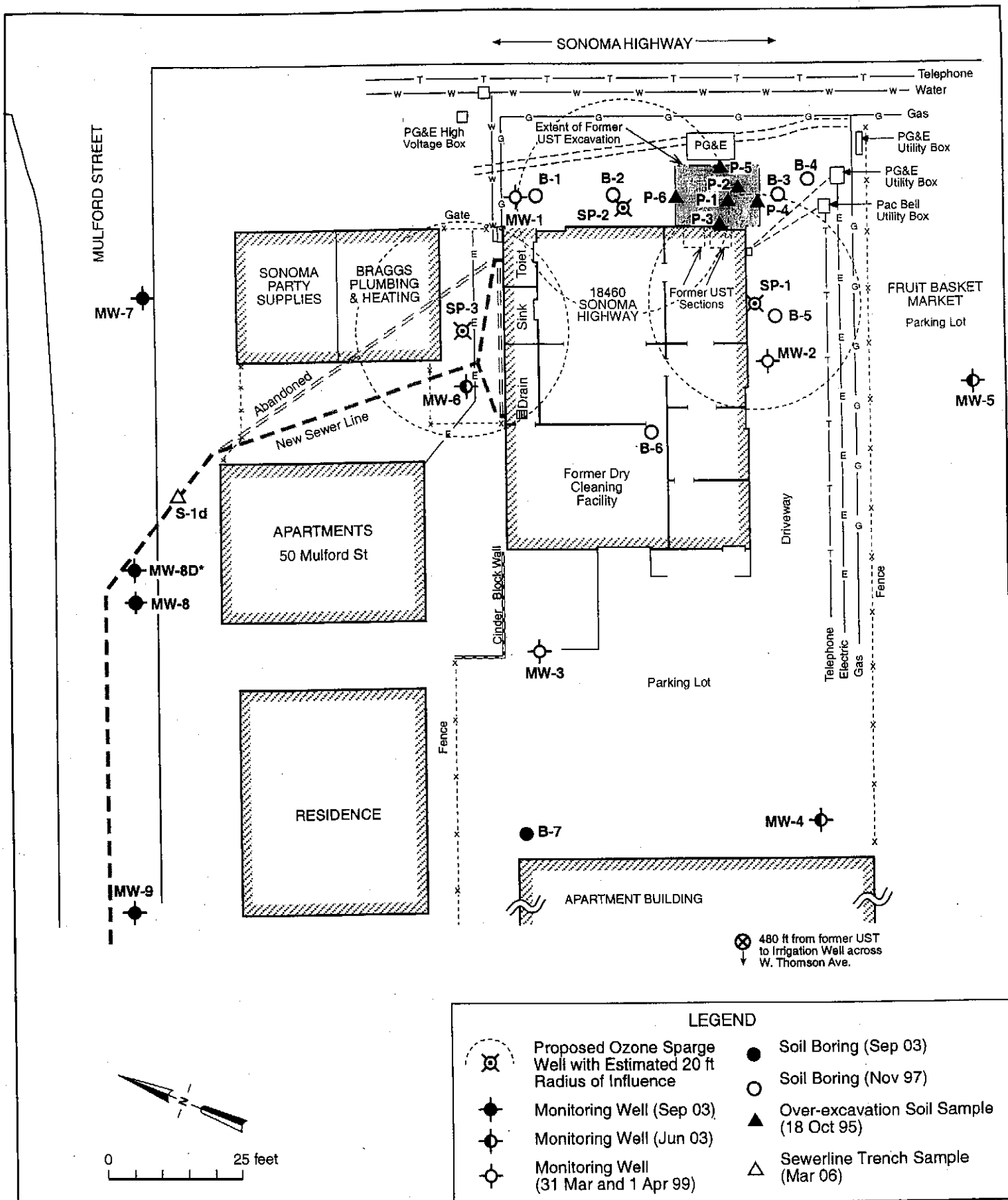
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R. Ely

August 2004



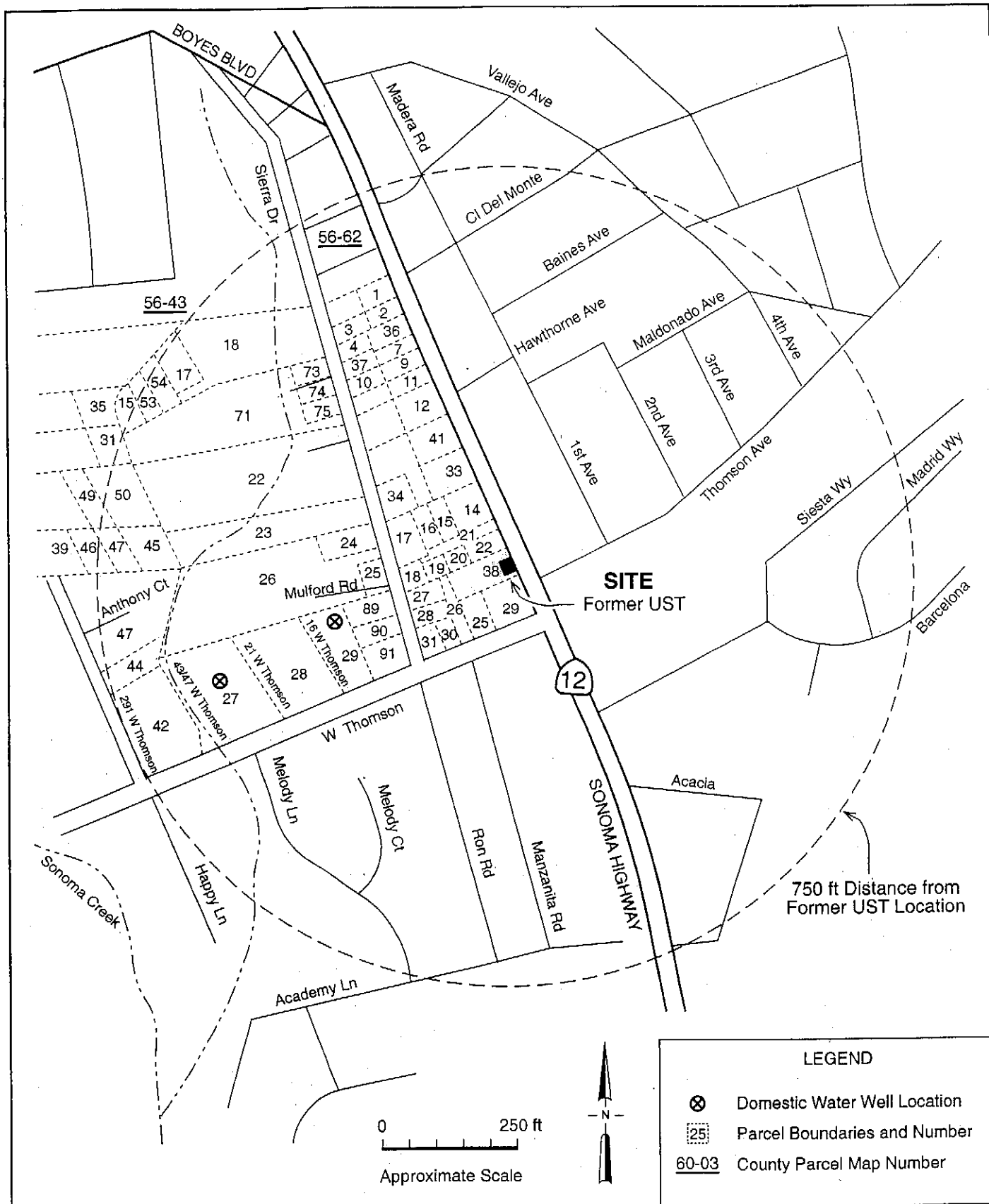
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ENVIRONMENTAL CONSULTANTS

SITE PLAN
with Proposed Ozone Sparge Wells
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE
3

JOB NUMBER	0268, 002.96	REVIEWED BY	EC&A, Richard Ely	DATE	April 1998	REVISED DATE	April 2007
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TRACE #319RG/23Apr07

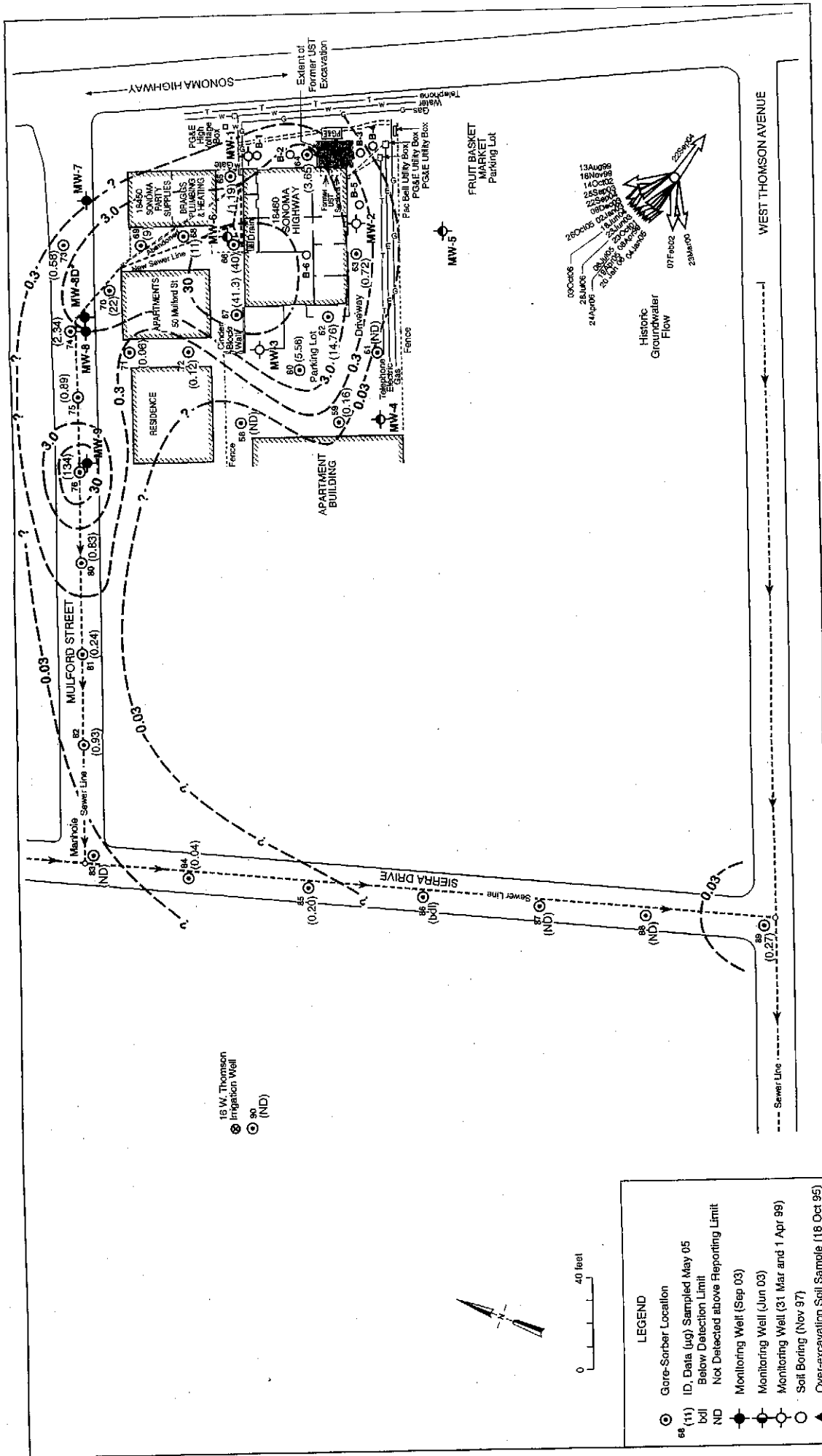


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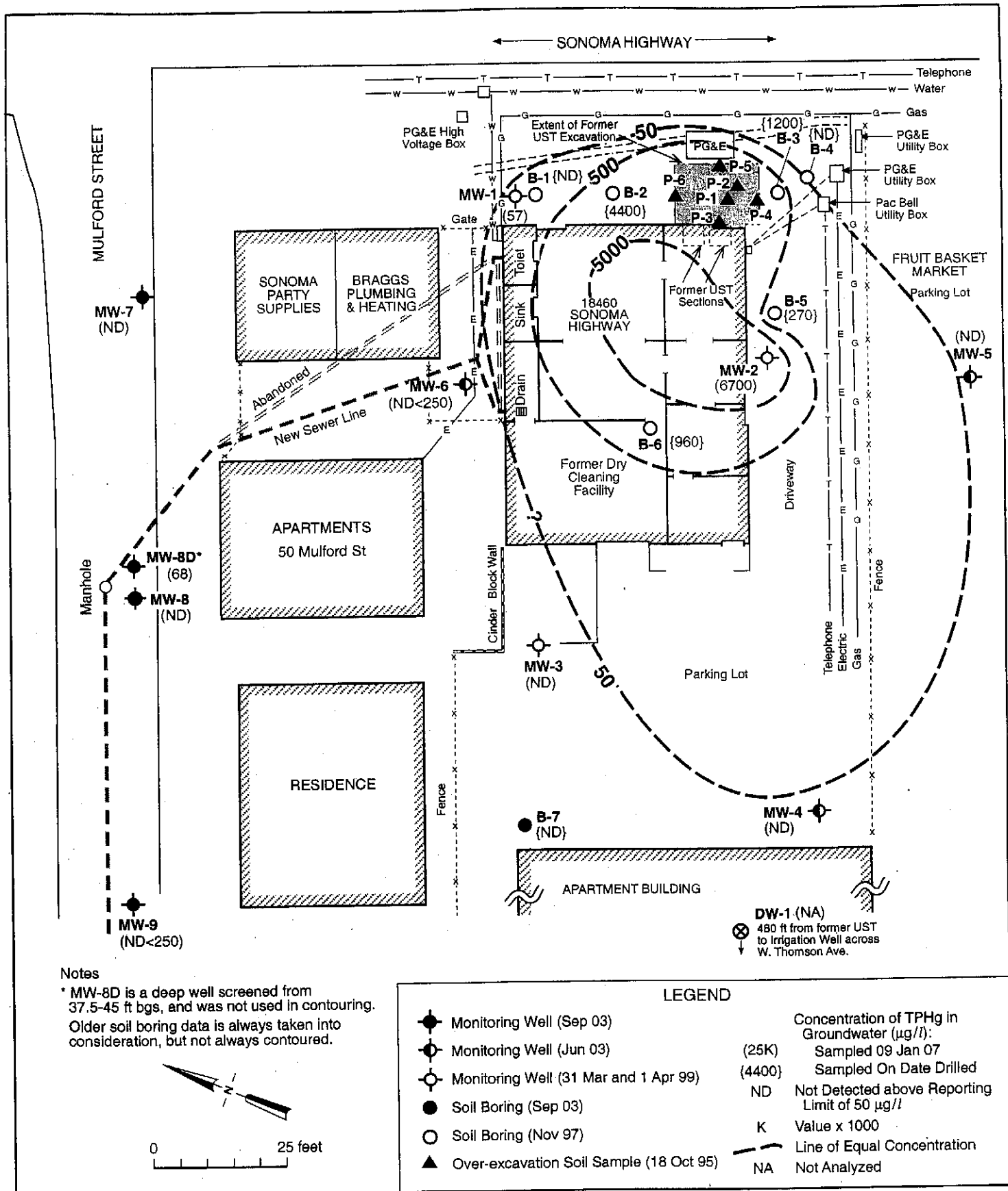
SENSITIVE RECEPTOR SURVEY MAP
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE
4

JOB NUMBER	0268, 002.96	REVIEWED BY	EC & A, Richard Ely	DATE	January 2001	REVISED DATE	November 2006
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EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS
 PCE IN SOIL GAS
 ISOCONCENTRATION CONTOUR MAP
 18460 Sonoma Highway
 Boyes Hot Springs, California
 FIGURE 5
 REVIEWED BY: EC&A, Richard Ely
 DATE: April 1998
 REVISED DATE: December 2006
 JOB NUMBER: 0268, 002.96
 TRACE #31919(050406)



TRACE #319/RG/19Apr07

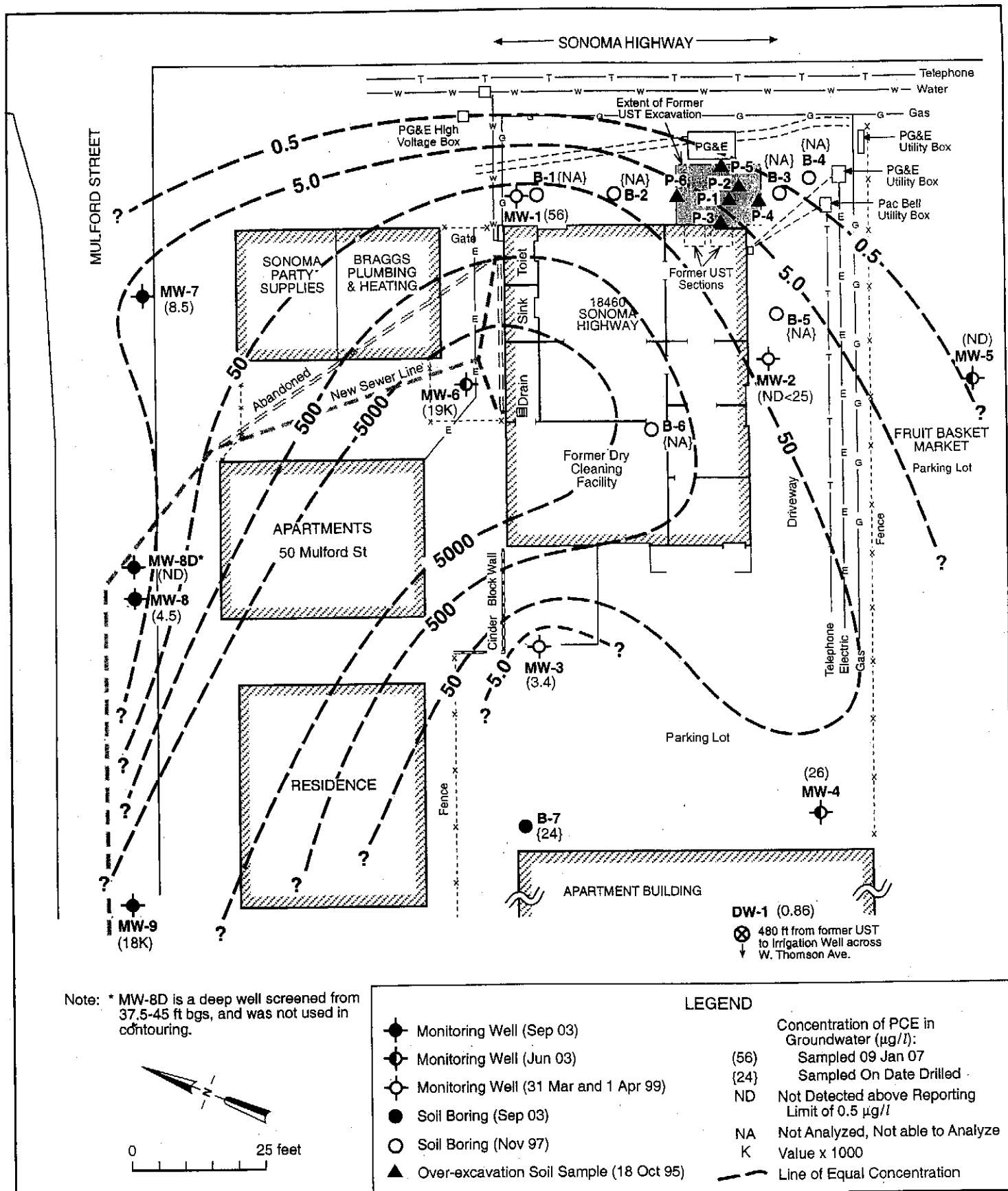
EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

TPHg in GROUNDWATER ISOCONCENTRATION MAP,
09 January 2007
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE

6

JOB NUMBER	0268, 002.96	REVIEWED BY	EC&A, Richard Ely	DATE	April 1998	REVISED DATE	April 2007
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TRACE #319/RG/19/Apr07

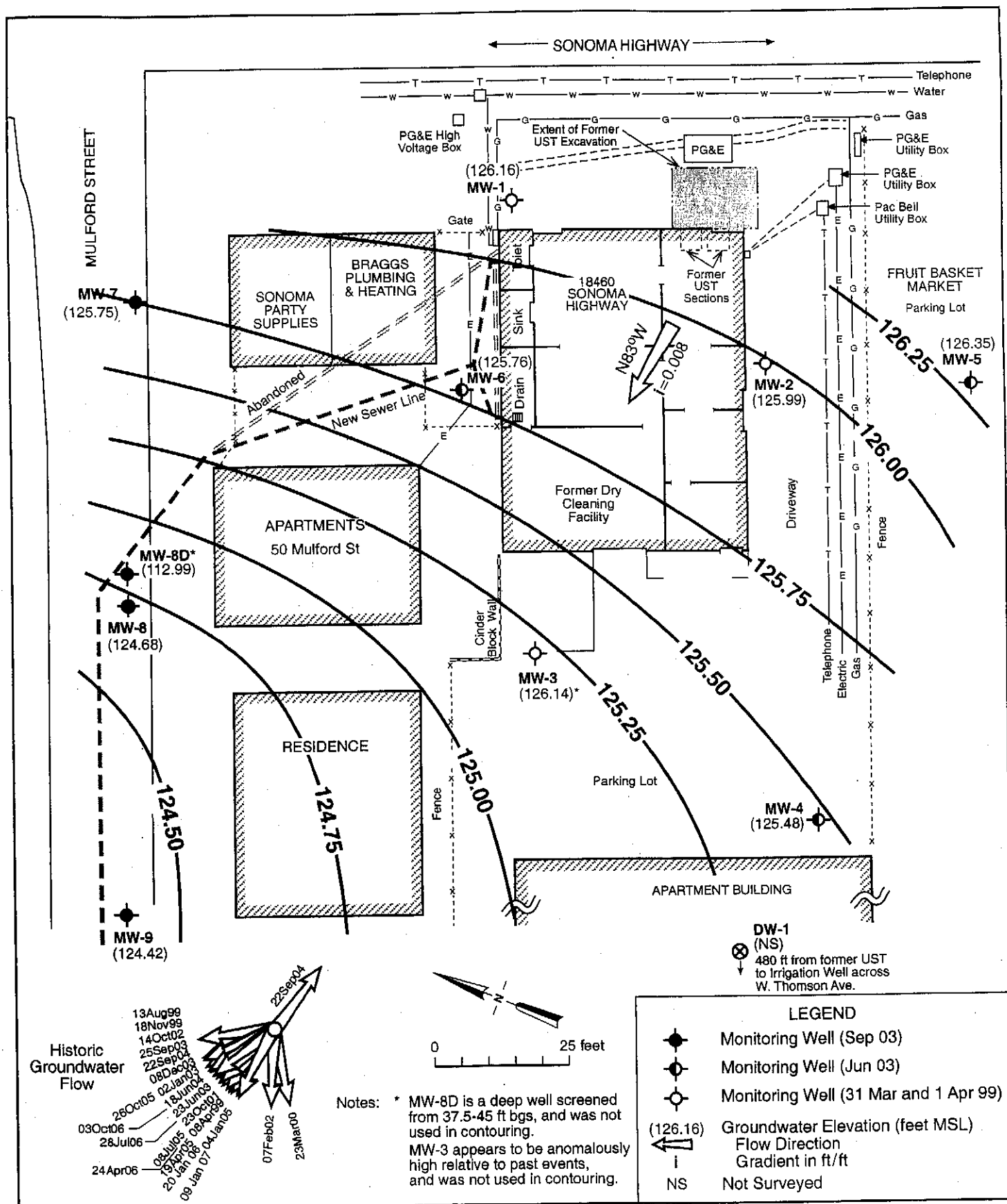
EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

PCE in GROUNDWATER ISOCONCENTRATION MAP,
09 January 2007
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE

7

JOB NUMBER	0268, 002.96	REVIEWED BY	EC&A, E.J. VandenBosch	DATE	April 1998	REVISED DATE	April 2007
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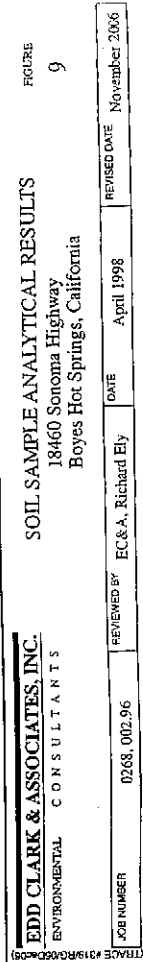
TRACE #319/RG/19Apr07

EDD CLARK & ASSOCIATES, INC.
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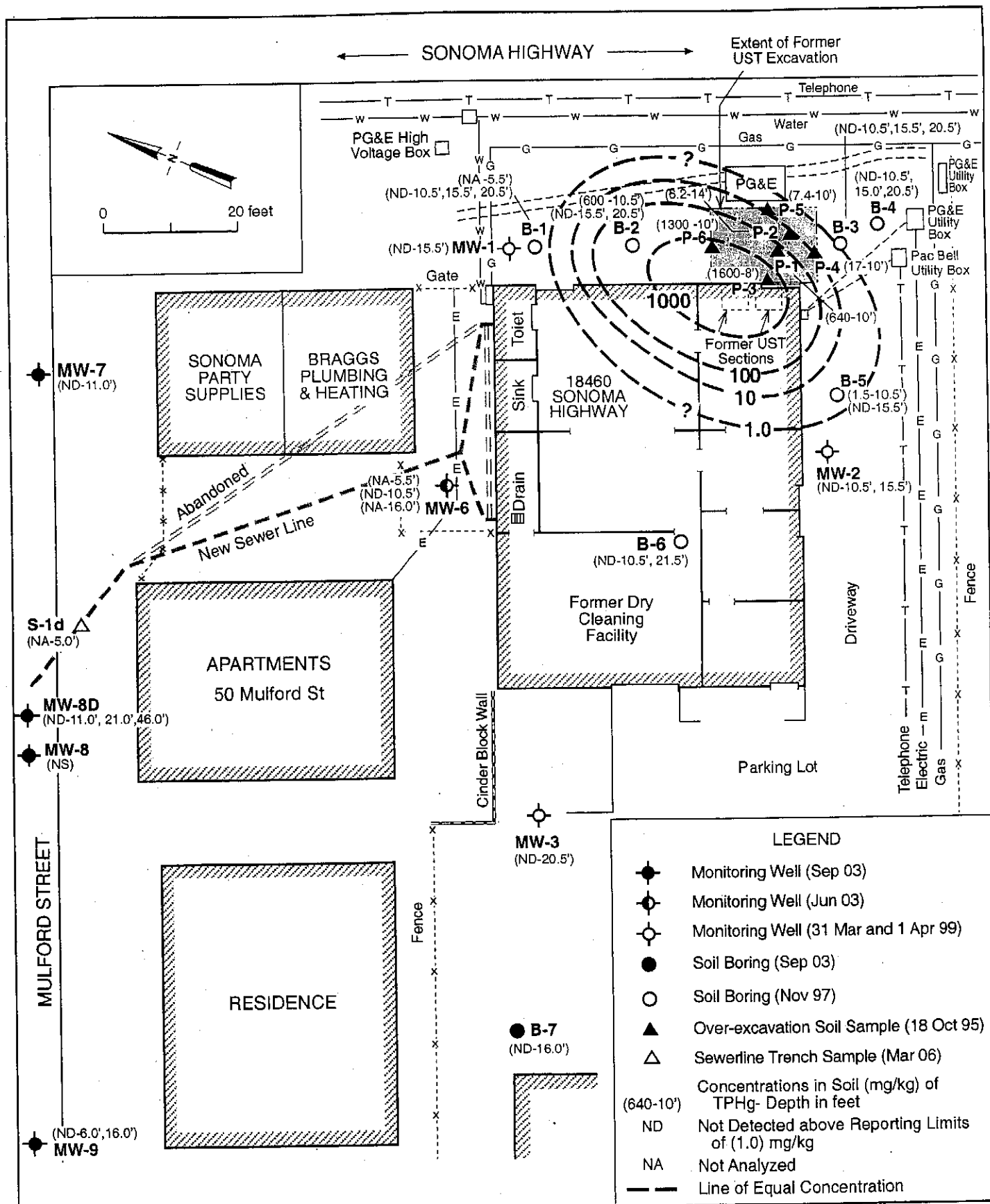
GROUNDWATER ELEVATION MAP
09 January 2007
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE
8

JOB NUMBER	0268, 002.96	REVIEWED BY	EC&A, E.J. VandenBosch	DATE	April 1998	REVISED DATE	April 2007
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EDD CLARK & ASSOCIATES, INC. ENVIRONMENTAL CONSULTANTS		SOIL SAMPLE ANALYTICAL RESULTS 18460 Sonoma Highway Boyes Hot Springs, California		FIGURE 9
JOB NUMBER	0268-002-96	REVIEWED BY	EC & A, Richard Ely	DATE
		April 1998		REVISID DATE
				November 2006



EDD CLARK & ASSOCIATES, INC.

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ISOCONCENTRATION CONTOUR MAP of TPHg in SOIL

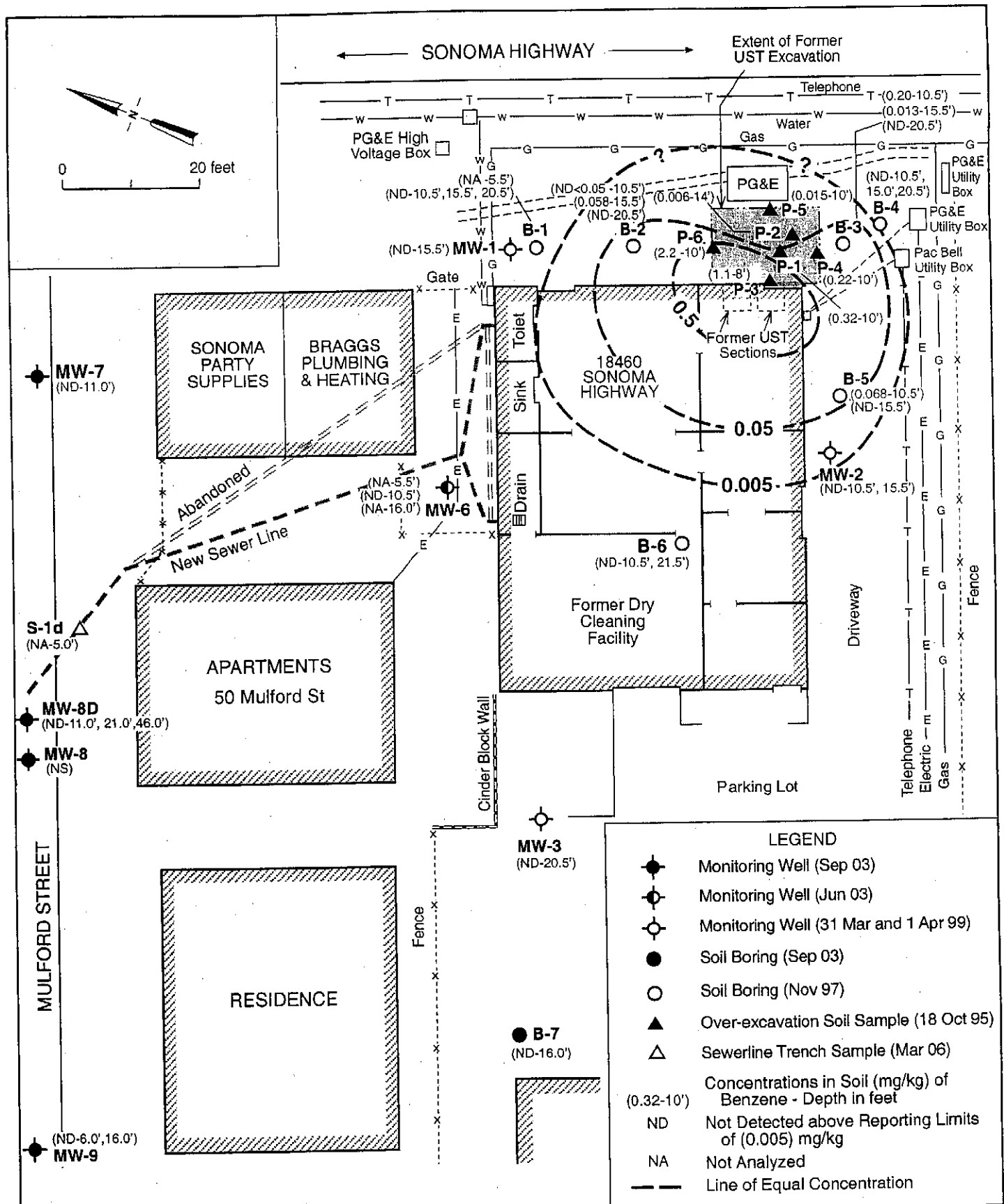
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE

10

JOB NUMBER	0268, 002.96	REVIEWED BY	EC&A, Richard Ely	DATE	December 2006	REVISED DATE	
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TRACE #319/RG/05Dec06



EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

**ISOCONCENTRATION CONTOUR MAP of
BENZENE in SOIL**
18460 Sonoma Highway
Boyes Hot Springs, California

FIGURE

11

JOB NUMBER	0268, 002.96	REVIEWED BY	EC&A, Richard Ely	DATE	December 2006	REVISED DATE
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TRACE #319/RG/05Dec06

**Table 1. Analytical Results - Soil and Groundwater Samples from UST Removal
18460 Sonoma Highway, Boyes Hot Springs, California**

Sample ID	Date	TPHg mg/kg	Benzene µg/kg	Toluene µg/kg	Ethyl- benzene µg/kg	Xylenes µg/kg	Total Lead mg/kg
Soil samples							
T1-SW*	08/16/95	17	ND<25	180	700	700	20
SP-1**	08/16/95	3.9	10	150	74	540	31
SP-2**	08/16/95	9300	ND<2500	85,000	130,000	440,000	620
Water sample (results in µg/l)							
T1-GW	08/16/95	13,000	860	3300	580	3500	NA

TPHg: Total petroleum hydrocarbons as gasoline
mg/kg: Milligrams per kilogram
µg/kg: Micrograms per kilogram
µg/l: Micrograms per liter
ND: Not detected above the reporting limits
NA: Not analyzed
*: Collected at 6 ft bgs
**: Soil stockpile sample

**Table 2. Analytical Results - Soil Samples from Over-excavation
18460 Sonoma Highway, Boyes Hot Springs, California**

Sample ID	Date	Depth ft	TPHg mg/kg	Benzene µg/kg	Toluene µg/kg	Ethylben- zene µg/kg	Xylenes µg/kg
P-1*	10/18/95	10	640	320	1100	4400	13000
P-2	10/18/95	14	6.2	6	8	14	81
P-3	10/18/95	8	1600	1100	41000	46000	210000
P-4	10/18/95	10	17	220	180	150	660
P-5	10/18/95	10	7.4	15	14	34	60
P-6	10/18/95	10	1300	2200	2400	2400	14000
SP-1**	10/18/95	---	76	140	370	470	2100
SP-2**	10/18/95	---	25	8	11	120	430

TPHg: Total petroleum hydrocarbons as gasoline
mg/kg: Milligrams per kilogram
µg/kg: Micrograms per kilogram
*: Sample location was over-excavated
**: Soil stockpile sample

**Table 3. Analytical Results - Soil Samples from Borings
18460 Sonoma Highway, Boyes Hot Springs, California**

Sample ID	Sample Depth ft bgs	Date	TPHg mg/kg	MTBE mg/kg	Benzene mg/kg	Toluene mg/kg	Ethyl- benzene mg/kg	Xylenes mg/kg	Lead mg/kg
B-1	5.5 - 6	11/10/97	NA	NA	NA	NA	NA	NA	6.9
	10.5 - 11	11/10/97	ND	ND	ND	ND	ND	ND	7.7
	15.5 - 16	11/10/97	ND	ND	ND	ND	ND	ND	6.4
	20.5 - 21	11/10/97	ND	ND	ND	ND	ND	ND	5.5
B-2	10.5 - 11	11/10/97	600 ^j	ND<1.6	ND<0.05	1.4	2.0	6.5	6.8
	15.5 - 16	11/10/97	ND	ND	0.058	0.009	0.007	0.019	ND
	20.5 - 21	11/10/97	ND	ND	ND	ND	ND	ND	8.0
B-3	10.5 - 11	11/10/97	ND	ND	0.020	ND	0.011	ND	NA
	15.5 - 16	11/10/97	ND	ND	0.013	ND	ND	ND	NA
	20.5 - 21	11/10/97	ND	ND	ND	ND	ND	ND	NA
B-4	10.5 - 11	11/10/97	ND	ND	ND	ND	ND	ND	NA
	15 - 15.5	11/10/97	ND	ND	ND	ND	ND	ND	NA
	20.5 - 21	11/10/97	ND	ND	ND	ND	ND	ND	NA
B-5	10.5 - 11	11/10/97	1.5 ^a	ND	0.068	0.010	0.016	0.024	NA
	15.5 - 16	11/10/97	ND	ND	ND	ND	ND	ND	NA
B-6	10.5 - 11	11/24/97	ND	ND	ND	ND	ND	ND	NA
	21.5 - 22	11/24/97	ND	ND	ND	ND	ND	ND	NA
B-7d-16.0 ⁽¹⁾	16.0	09/12/03	ND	NA	ND	ND	ND	ND	NA
Reporting Limits			1.0	0.05	0.005	0.005	0.005	0.005	3.0

Table 3. Analytical Results - Soil Samples from Borings
18460 Sonoma Highway, Boyes Hot Springs, California

<u>Notes</u>	
TPHg:	Total petroleum hydrocarbons as gasoline
MTBE:	Methyl tert-butyl ether
ft bgs:	Feet below ground surface
mg/kg:	Milligrams per kilogram
ND:	None detected above the respective reporting limit
NA:	Not analyzed
(1):	Sample also analyzed for halogenated volatile organics by Analytical Method SW8010; all results were ND
a:	Unmodified or weakly modified gasoline is significant
j:	No recognizable pattern

**Table 4. Analytical Results - Grab-groundwater Samples from Borings
18460 Sonoma Highway, Boyes Hot Springs, California**

Sample ID	Date	TPHg mg/l	MTBE µg/l	Benzene µg/l	Toluene µg/l	Ethyl- benzene µg/l	Xylenes µg/l	Lead mg/l
B-1 (W)	11/10/97	ND ⁱ	ND	ND	ND	ND	ND	ND
B-2 (W)	11/10/97	4.4 ^{a,i}	ND<80	200	59	73	440	ND
B-3 (W)	11/10/97	1.2 ^a	ND<20	77	4.6	16	8.0	ND
B-4 (W)	11/10/97	ND	ND	ND	ND	ND	ND	NA
B-5 (W)	11/10/97	0.27 ^{a,i}	ND	8.9	2.1	3.2	8.8	NA
B-6 (W)	11/24/97	0.96 ^f	ND	ND	0.81	ND	0.94	NA
B-7W-d15.0 ⁽¹⁾	09/12/03	ND	ND<0.5	ND	ND	ND	ND	NA
Reporting Limits		0.05	5.0	0.5	0.5	0.5	0.5	0.005

TPHg: Total petroleum hydrocarbons as gasoline

MTBE: Methyl tert-butyl ether

mg/l: Milligrams per liter

µg/l: Micrograms per liter

ND: None detected above the respective reporting limit

NA: Not analyzed

(1): Sample also analyzed for volatile organics and oxygenates by Method SW8260B. Tetrachloroethene (PCE) was detected at 24 µg/l; all other results were ND

i: Liquid sample that contains greater than ~5 vol. % sediment

a: Unmodified or weakly modified gasoline is significant

f: One to a few isolated peaks present

Table 5. Analytical Results - Soil Samples from Monitoring Well Borings
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Date	Depth feet	TPHg mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg	MTBE mg/kg	PCE µg/kg
MW-1 ⁽¹⁾	03/31/99	15.5 - 16	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.05	NA
MW-2 ⁽¹⁾	03/31/99	10.5 - 11	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.05	NA
MW-2 ⁽¹⁾	03/31/99	15.5 - 16	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.05	NA
MW-3 ⁽¹⁾	04/01/99	20.5 - 21	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.05	NA
MW-4d-10.0 ⁽²⁾	06/18/03	10.0	NA	NA	NA	NA	NA	NA	ND<5.0
MW-4d-15.0 ⁽³⁾	06/18/03	15.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<5.0	8.7
MW-4d-20.5 ⁽²⁾	06/18/03	20.5	NA	NA	NA	NA	NA	NA	ND<5.0
MW-5d-15.0 ⁽³⁾	06/18/03	15.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<5.0	ND<5.0
MW-6d-5.5 ⁽²⁾	06/18/03	5.5	NA	NA	NA	NA	NA	NA	4600
MW-6d-10.5 ⁽³⁾	06/18/03	10.5	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<100	2600
MW-6d-16.0 ⁽²⁾	06/18/03	16.0	NA	NA	NA	NA	NA	NA	190
MW-7d-11.0 ⁽²⁾	09/12/03	11.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA	ND<5.0
MW-8D-d11.0 ⁽²⁾	09/10/03	11.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA	ND<5.0
MW-8D-d21.0 ⁽²⁾	09/10/03	21.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA	ND<5.0
MW-8D-d46.0 ⁽²⁾	09/12/03	46.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA	ND<5.0
MW-8 ⁽⁴⁾	09/11/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-9d-6.0 ^(2,5)	09/11/03	6.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA	ND<5.0
MW-9d-16.0 ⁽²⁾	09/11/03	16.0	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA	820

**Table 5. Analytical Results - Soil Samples from Monitoring Well Borings
18460 Sonoma Highway, Boyes Hot Springs, California**

<u>Notes</u>	
TPHg:	Total petroleum hydrocarbons as gasoline
MTBE:	Methyl tert-butyl ether; analyzed by EPA Method 8020 unless noted otherwise
PCE:	Tetrachloroethene
mg/kg:	Milligrams per kilogram
ND:	Not detected above the reporting limit
NA:	Not analyzed
NS:	Not sampled
(1):	Sample analyzed for gasoline-range hydrocarbons, BTEX compounds and MTBE by Methods SW8015m/8020.
(2):	Sample analyzed for halogenated volatile organics by Method SW8010. Samples from MW-7, MW-8D, MW-9 were also analyzed for gasoline-range hydrocarbons and BTEX compounds by Methods SW8015Cm/8021B. Results not reported above were ND.
(3):	Sample analyzed for gasoline-range hydrocarbons and BTEX compounds by Methods SW8015Cm/8021B, and for volatile organics by Method SW8260. Results not reported above were ND.
(4):	Shallow well MW-8 was installed to a depth of 20 feet near deep well MW-8D. Soils encountered in MW-8 were similar to those in MW-8D; therefore, soil samples were not collected from MW-8.
(5)	Sample analyzed beyond holding time.

0268\table 5 mw soil

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPH _g µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-1	04/08/99	7.90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	08/13/99	10.57	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<.05
	11/18/99	11.86	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/23/00	8.39	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/23/01	12.66	ND<50	ND<0.5	ND<0.5	ND<0.5	1.2
	02/07/02 *	8.51	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/25/02 *	9.93	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/14/02 *	11.96	ND<50	ND<0.5	ND<0.5	0.72	2.2
	01/02/03 *	9.21	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/23/03 *	8.90	ND<50	ND<0.5	ND<0.5	ND<0.5	0.71
	09/25/03 *	11.27	ND<50	ND<1.0	ND<1.0	ND<1.0	ND<1.0
	12/08/03 *	11.03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	8.34	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04 *	10.09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04 *	12.39	50 ^a	0.62	5.0	1.4	6.5
	01/04/05 *	8.96	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/19/05 *	7.69	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05	9.03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	11.80	ND<50 ⁿ	ND<0.5	ND<0.5	0.98	1.0
	01/20/06	8.60	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/24/06	7.32	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/28/06	9.98	57 ^f	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/04/06	12.35	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/09/07	9.27	57 ^f	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-2	04/08/99	7.57	2000 ^a	110	4.8	6.4	17
	08/13/99	10.33	6500 ^{a,c}	750	23	34	22
	11/18/99	11.47	4200 ^a	250	7.7	2.6	6.9
	03/23/00	9.08	4000 ^a	380	8.0	8.8	16
	10/23/01	12.40	8800 ^a	900	29	21	14

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-2 continued	02/07/02 *	8.75	7200 ^a	330	5.4	6.7	ND
	07/25/02 *	9.75	8300 ^a	1200	ND<25	27	ND<25
	10/14/02 *	11.61	6400 ^a	970	ND<25	ND<25	ND<25
	01/02/03 *	9.08	770 ^a	48	ND<2.5	ND<2.5	ND<2.5
	06/23/03 *	8.66	6300 ^a	1200	18	47	25
	09/25/03 *	10.95	7800 ^a	1300	ND<25	ND<25	ND<25
	12/08/03 *	10.75	4400 ^a	370	ND<5.0	ND<5.0	ND<5.0
	03/24/04 *	8.23	5100 ^a	1100	ND<25	ND<25	ND<25
	06/18/04 *	9.86	17,000 ^a	1400	ND<50	ND<50	ND<50
	09/22/04	12.50	6700 ^a	1400	38	23	38
	01/04/05	8.80	2500 ^a	130	2.6	3.6	3.2
	04/19/05	7.48	6600 ^a	1100	23	22	16
	07/08/05	8.88	11,000 ^a	1400	23	38	18
	10/26/05	11.51	10,000 ^a	1700	17	31	6.7
	01/20/06	8.46	6800 ^a	880	15	21	9.3
	04/24/06	7.13	6400 ^a	1200	14	17	11
	07/28/06	9.76	17,000 ^a	1800	19	53	ND<10
	10/04/06	12.09	13,000 ^a	1500	15	33	5.8
	01/09/07	9.37	6700 ^a	1100 ⁽¹⁾	16	25	14
MW-3	04/08/99	8.64	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	08/13/99	8.94	75 ^f	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	11/18/99	10.46	95 ^f	ND<0.5	3.1	ND<0.5	ND<0.5
	03/23/00	8.31	99 ^f	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/23/01	12.55	100 ^f	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	02/07/02*	7.80	99 ^f	ND<0.5	3.4	ND<0.5	ND<0.5
	07/25/02*	9.02	64 ^f	ND<5.0	0.91	ND<5.0	ND<5.0
	10/14/02*	10.70	64 ^b	ND<0.5	ND<0.5	0.73	2.0
	01/02/03*	7.81	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/23/03*	8.28	ND<50	ND<1.7	ND<1.7	ND<1.7	ND<1.7

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-3 continued	09/25/03 *	10.05	ND<50	ND<5.0	ND<5.0	ND<5.0	ND<5.0
	12/08/03 *	7.38	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	7.81	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04 *	8.93	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04 *	11.10	ND<50	0.52	5.3	1.6	7.3
	01/04/05 *	8.34	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/19/05 *	7.92	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05	8.42	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	10.62	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/20/06	8.12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/24/06	6.71	ND<50 ^a	1.7	1.7	0.71	3.5
	07/28/06	9.09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/04/06	11.17	ND<50	ND<0.5	ND<0.5	0.81	1.6
	01/09/07	7.65	ND<50	0.65 ⁽¹⁾	1.5 ⁽¹⁾	1.3 ⁽¹⁾	3.8 ⁽¹⁾
MW-4	06/23/03*	7.95	70 ^f	ND<2.5	ND<2.5	ND<2.5	ND<2.5
	09/25/03 *	10.08	ND<50	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	12/08/03 *	10.02	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	7.43	ND<50	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	06/18/04 *	9.03	ND<50	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	09/22/04 *	11.01	52 ^a	0.71	4.9	1.2	4.8
	01/04/05 *	8.15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05	8.09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	10.60	68 ^a	0.5	ND<0.5	3.8	3.9
	01/20/06	7.72	ND<50	0.94	ND<0.5	ND<0.5	0.65
	04/24/06	6.51	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/28/06	8.96	86 ^f	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/04/06	11.18	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/09/07	8.47	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-5	06/23/03*	7.60	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/25/03 *	9.77	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/08/03 *	9.74	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	7.14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04 *	8.76	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04 *	13.68	110 ^a	3.5	21	4.8	21
	01/04/05 *	8.00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/19/05 *	6.44	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05 *	7.81	ND<50	0.59	ND<0.5	ND<0.5	ND<0.5
	10/26/05	10.29	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/20/06	7.48	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/24/06	5.99	ND<50	0.75	0.76	ND<0.5	1.3
	07/28/06	8.63	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/04/06	10.85	ND<50	0.57	2.0	0.54	1.6
	01/09/07	8.33	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-6	06/23/03*	8.42	1400 ^f	ND<100	ND<100	ND<100	ND<100
	09/25/03 *	10.71	6800 ^f	ND<500	ND<500	ND<500	ND<500
	12/08/03 *	10.59	9900 ^f	ND<200	ND<200	ND<200	ND<200
	03/24/04 *	7.96	2800 ^f	ND<100	ND<100	ND<100	ND<100
	06/18/04 *	9.61	6200 ^f	ND<500	ND<500	ND<500	ND<500
	09/22/04	11.83	8900 ^f	1.2	5.9	1.4	5.2
	01/04/05	8.62	ND<1700 ⁿ	ND<17	ND<17	ND<17	ND<17
	04/19/05	7.22	ND<500 ⁿ	ND<5.0	ND<5.0	ND<5.0	ND<5.0
	07/08/05 *	8.60	ND<500 ⁿ	1.6	1.9	0.94	2.9
	10/26/05	11.32	ND<1000 ⁿ	ND<10	ND<10	ND<10	ND<10
	01/20/06	8.23	ND<100 ⁿ	0.82	0.83	ND<0.5	1.4
	04/24/06	6.95	ND<50 ⁿ	ND<0.5	0.60	ND<0.5	0.69
	07/28/06	9.50	ND<500 ^{f, n}	ND<5.0	ND<5.0	ND<5.0	ND<5.0

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-6 continued	10/04/06	11.88	ND<1000 ⁿ	ND<10	ND<10	ND<10	ND<10
	01/09/07	8.92	ND<250 ⁿ	ND<2.5	ND<2.5	ND<2.5	ND<2.5
MW-7	09/25/03 *	9.44	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/08/03 *	9.18	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	6.73	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04 *	8.25	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04 *	10.58	53 ^a	0.54	6.5	2.0	9.7
	01/04/05 *	7.04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/19/05 *	5.75	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05	7.16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	10.07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/20/06	6.60	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/24/06	5.77	ND<50	ND<0.5	ND<0.5	ND<0.5	0.55
	07/28/06	8.17	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/04/06	10.57	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/09/07	7.31	ND<50	ND<0.5	ND<0.5	0.54	1.2 ⁽¹⁾
MW-8	09/25/03 *	7.88	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/08/03 *	7.48	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	6.15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04 *	7.19	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04 *	9.31	120 ^a	2.7	22	6.2	28
	01/04/05 *	6.19	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/19/05 *	5.59	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05	6.38	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	8.84	ND<50	ND<0.5	ND<0.5	0.84	0.86
	01/20/06	6.16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/24/06	5.65	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/28/06	6.17	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-8 continued	10/04/06	9.37	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/09/07	6.54	ND<50	ND<0.5 ⁽¹⁾	0.73 ⁽¹⁾	0.62 ⁽¹⁾	1.8 ⁽¹⁾
MW-8D +	09/25/03 *	12.50	ND<50	ND<0.5	1.3	ND<0.5	1.9
	12/08/03 *	7.46	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04 *	9.87	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04 *	6.58	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04 *	14.01	110 ^a	3.2	19	4.3	19
	01/04/05 *	16.56	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/19/05 *	15.49	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/08/05	17.10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	21.16	73 ^a	1.1	ND<0.5	2.9	3.4
	01/20/06	23.58	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/24/06	12.89	ND<50	1.1	1.4	0.56	2.6
	07/28/06	20.12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/04/06	16.63	ND<50	ND<0.5	0.52	ND<0.5	ND<0.5
	01/09/07	17.94	68 ^a	3.1 ⁽¹⁾	2.2 ⁽¹⁾	4.3 ⁽¹⁾	14 ⁽¹⁾
MW-9	09/25/03 *	7.61	5200 ^f	ND<500	ND<500	ND<500	ND<500
	12/08/03 *	7.27	5500 ^f	ND<100	ND<100	ND<100	ND<100
	03/24/04 *	5.87	7200 ^f	ND<250	ND<250	ND<250	ND<250
	06/18/04 *	6.89	7600 ^f	ND<500	ND<500	ND<500	ND<500
	09/22/04	8.65	6900 ^f	ND<0.5	1.7	0.88	4.2
	01/04/05	6.05	ND<1000 ⁿ	ND<10	ND<10	ND<10	ND<10
	04/19/05	5.59	600 ^{b,n}	ND<5.0	ND<5.0	ND<5.0	ND<5.0
	07/08/05 *	6.14	ND<500 ⁿ	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	8.37	ND<500 ⁿ	ND<5.0	ND<5.0	ND<5.0	ND<5.0
	01/20/06	6.04	ND<1000 ⁿ	ND<10	ND<10	ND<10	ND<10
	04/24/06	5.50	ND<50 ⁿ	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/28/06	6.95	ND<500 ^{f,n}	ND<5.0	ND<5.0	ND<5.0	ND<5.0

Table 6. Analytical Results - Groundwater Samples from Monitoring Wells: Fuel Hydrocarbons
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethylbenzene µg/l	Xylenes µg/l
MW-9 continued	10/04/06	8.93	ND<50 ^a	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	01/09/07	6.42	ND<250 ^a	ND<2.5	ND<2.5	ND<2.5	ND<2.5

Benzene, toluene, ethylbenzene and xylenes analyses by Method SW8021B unless otherwise noted.

DTW: Depth to water below top of casing in feet below ground surface (ft bgs)

TPHg: Total petroleum hydrocarbons as gasoline

µg/l: Micrograms per liter

ND: Not detected above the reporting limit

NA: Not analyzed

a: Unmodified or weakly modified gasoline is significant

b: Heavier gasoline range compounds are significant (aged gasoline?)

c: Lighter gasoline range compounds (the most mobile fraction) are significant

f: One to a few isolated non-target peaks present

n: TPHg range non-target isolated peaks subtracted out of the TPHg concentration at EC&A's request

*: Benzene, toluene, ethylbenzene and xylenes analyses by Method SW8260B

+: MW-8D is a deep well installed to a depth of 45 ft and screened from 37.5 ft to 45 ft.

(1): Analysis by EPA Method SW8260B

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

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Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-1	04/08/99	7.90	ND<1.0	NA	NA	NA	NA
	08/13/99	10.57	ND<5.0*	NA	NA	NA	NA
	11/18/99	11.86	ND<5.0*	NA	NA	NA	NA
	03/23/00	8.39	ND<5.0*	NA	NA	NA	NA
	10/23/01	12.66	ND<1.0	ND	ND	ND	ND
	02/07/02	8.51	ND<1.0	ND	ND	ND	ND
	07/25/02	9.93	ND<0.5	ND	ND	ND	ND
	10/14/02	11.96	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/02/03	9.21	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/23/03	8.90	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/25/03	11.27	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	12/08/03	11.03	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	03/24/04	8.34	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/18/04	10.09	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/22/04	12.39	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/04/05	8.96	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	04/19/05	7.69	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	07/08/05	9.03	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	11.80	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	01/20/06	8.60	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	04/24/06	7.32	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/28/06	9.98	ND<2.5	ND<2.5	ND<25	ND<2.5	ND<2.5
	10/04/06	12.35	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	01/09/07	9.27	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
MW-2	04/08/99	7.57	ND<1.0	4.8	ND	NA	NA
	08/13/99	10.33	ND<2.5	4.5	ND	NA	NA
	11/18/99	11.47	110*	NA	NA	NA	NA
	03/23/00	9.08	ND<2.5	2.6	26	ND<1.0	35
	10/23/01	12.40	ND<2.5	ND	ND	ND	130

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-2 continued	02/07/02	8.75	ND<5.0	ND	ND	ND	92
	07/25/02	9.75	ND<25	ND	ND	ND	180
	10/14/02	11.61	ND<5.0	10	ND<50	ND<25	170
	01/02/03	9.08	ND<2.5	ND<2.5	ND<25	ND<2.5	34
	06/23/03	8.66	ND<17	ND<17	ND<170	ND<17	240
	09/25/03	10.95	ND<25	ND<25	ND<250	ND<25	260
	12/08/03	10.75	ND<5.0	5.4	ND<50	ND<5.0	100
	03/24/04	8.23	ND<25	ND<25	ND<250	ND<25	ND<25
	06/18/04	9.86	ND<50	ND<50	ND<500	ND<50	240
	09/22/04	12.50	ND<50	ND<50	ND<500	ND<50	310
	01/04/05	8.80	ND<2.5	8.4	ND<25	ND<2.5	170
	04/19/05	7.48	ND<17	ND<17	ND<170	ND<17	270
	07/08/05	8.88	ND<10	21	ND<100	ND<10	390
	10/26/05	11.51	ND<50	ND<50	ND<500	ND<50	380
	01/20/06	8.46	ND<10	15	ND<100	ND<10	280
	04/24/06	7.13	ND<50	ND<50	ND<500	ND<50	170
	07/28/06	9.76	ND<50	ND<50	ND<500	ND<50	440
	10/04/06	12.09	ND<50	ND<50	ND<500	ND<50	320
	01/09/07	9.37	ND<25	ND<25	ND<250	ND<25	280
MW-3	04/08/99	8.64	ND<1.0	ND	ND	NA	NA
	08/13/99	8.94	ND<5.0*	NA	NA	NA	NA
	11/18/99	10.46	ND<5.0*	NA	NA	NA	NA
	03/23/00	8.31	ND<5.0*	NA	NA	NA	NA
	10/23/01	12.55	ND<1.0	ND	ND	ND	ND
	02/07/02	7.80	ND<2.5	ND	ND	ND	ND
	07/25/02	9.02	ND<5.0	ND	ND	ND	ND
	10/14/02	10.70	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/02/03	7.81	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-3 continued	06/23/03	8.28	ND<1.7	ND<1.7	ND<17	ND<1.7	ND<1.7
	09/25/03	10.05	ND<5.0	ND<5.0	ND<50	ND<5.0	ND<5.0
	12/08/03	7.38	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	03/24/04	7.81	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/18/04	8.93	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/22/04	11.10	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/04/05	8.34	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/19/05	7.92	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/08/05	8.42	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	10.62	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/20/06	8.12	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/24/06	6.71	ND<10	ND<10	ND<100	ND<10	ND<10
	07/28/06	9.09	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	10/04/06	11.17	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/09/07	7.65	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
MW-4	06/23/03	7.95	ND<2.5	ND<2.5	ND<25	ND<2.5	ND<2.5
	09/25/03	10.08	ND<1.7	ND<1.7	ND<17	ND<1.7	ND<1.7
	12/08/03	10.02	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	03/24/04	7.43	ND<1.7	ND<1.7	ND<17	ND<1.7	ND<1.7
	06/18/04	9.03	ND<1.7	ND<1.7	ND<17	ND<1.7	ND<1.7
	09/22/04	11.01	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	01/04/05	8.15	ND<2.5	ND<2.5	ND<25	ND<2.5	ND<2.5
	07/08/05	8.09	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	10.60	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	01/20/06	7.72	ND<1.7	ND<1.7	ND<17	ND<1.7	ND<1.7
	04/24/06	6.51	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/28/06	8.96	ND<2.5	ND<2.5	ND<25	ND<2.5	ND<2.5
	10/04/06	11.18	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0
	01/09/07	8.47	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-5	06/23/03	7.60	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/25/03	9.77	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	12/08/03	9.74	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	03/24/04	7.14	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/18/04	8.76	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/22/04	13.68	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/04/05	8.00	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/19/05	6.44	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/08/05	7.81	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	10.29	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/20/06	7.48	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/24/06	5.99	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/28/06	8.63	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/04/06	10.85	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/09/07	8.33	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
MW-6	06/23/03	8.42	ND<100	ND<100	ND<1000	ND<100	ND<100
	09/25/03	10.71	ND<500	ND<500	ND<5000	ND<500	ND<500
	12/08/03	10.59	ND<200	ND<200	ND<2000	ND<200	ND<200
	03/24/04	7.96	ND<100	ND<100	ND<1000	ND<100	ND<100
	06/18/04	9.61	ND<500	ND<500	ND<5000	ND<500	ND<500
	09/22/04	11.83	ND<500	ND<500	ND<5000	ND<500	ND<500
	01/04/05	8.62	ND<170	ND<170	ND<1700	ND<170	ND<170
	04/19/05	7.22	ND<250	ND<250	ND<2500	ND<250	ND<250
	07/08/05	8.60	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	11.32	ND<500	ND<500	ND<5000	ND<500	ND<500
	01/20/06	8.23	ND<500	ND<500	ND<5000	ND<500	ND<500
	04/24/06	6.95	ND<500	ND<500	ND<5000	ND<500	ND<500
	07/28/06	9.50	ND<1000	ND<1000	ND<10,000	ND<1000	ND<1000

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-6 continued	10/04/06	11.88	ND<250	ND<250	ND<2500	ND<250	ND<250
	01/09/07	8.92	ND<500	ND<500	ND<5000	ND<500	ND<500
MW-7	09/25/03	9.44	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	12/08/03	9.18	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	03/24/04	6.73	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/18/04	8.25	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/22/04	10.58	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/04/05	7.04	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/19/05	5.75	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/08/05	7.16	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	10.07	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/20/06 ⁽¹⁾	6.60	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/24/06	5.77	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/28/06	8.17	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/04/06	10.57	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/09/07	7.31	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
MW-8	09/25/03	7.88	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	12/08/03	7.48	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	03/24/04	6.15	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/18/04	7.19	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/22/04	9.31	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/04/05	6.19	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/19/05	5.59	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/08/05	6.38	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	8.84	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/20/06	6.16	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/24/06	5.65	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/28/06	6.17	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-8 continued	10/04/06	9.37	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/09/07	6.54	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
MW-8D +	09/25/03	12.50	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	12/08/03	7.46	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	03/24/04	9.87	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	06/18/04	6.58	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	09/22/04	14.01	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/04/05	16.56	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/19/05	15.49	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/08/05	17.10	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	21.16	1.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/20/06	23.58	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	04/24/06	12.89	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	07/28/06	20.12	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/04/06	16.63	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	01/09/07	17.94	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
MW-9	09/25/03	7.61	ND<500	ND<500	ND<5000	ND<500	ND<500
	12/08/03	7.27	ND<100	ND<100	ND<1000	ND<100	ND<100
	03/24/04	5.87	ND<250	ND<250	ND<2500	ND<250	ND<250
	06/18/04	6.89	ND<500	ND<500	ND<5000	ND<500	ND<500
	09/22/04	8.65	ND<500	ND<500	ND<5000	ND<500	ND<500
	01/04/05	6.05	ND<250	ND<250	ND<2500	ND<250	ND<250
	04/19/05	5.59	ND<1000	ND<1000	ND<10,000	ND<1000	ND<1000
	07/08/05	6.14	ND<0.5	ND<0.5	ND<5.0	ND<0.5	ND<0.5
	10/26/05	8.37	ND<500	ND<500	ND<5000	ND<500	ND<500
	01/20/06	6.04	ND<500	ND<500	ND<5000	ND<500	ND<500
	04/24/06	5.50	ND<500	ND<500	ND<5000	ND<500	ND<500
	07/28/06	6.95	ND<500	ND<500	ND<5000	ND<500	ND<500

Table 7. Analytical Results - Groundwater Samples from Monitoring Wells: MTBE, Other Oxygenates and Lead Scavengers
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	MTBE µg/l	DIPE µg/l	TBA µg/l	EDB µg/l	1,2-DCA µg/l
MW-9 continued	10/04/06	8.93	ND<50	ND<50	ND<500	ND<50	ND<50
	01/09/07	6.42	ND<500	ND<500	ND<5000	ND<500	ND<500

DTW: Depth to water below top of casing in feet below ground surface (ft bgs)
MTBE: Methyl tert-butyl ether; analyzed by Analytical Method SW8260B unless noted otherwise
DIPE: Di-isopropyl ether
TBA: t-Butyl alcohol
EDB: 1,2-dibromoethane (ethylene dibromide)
1,2-DCA: 1,2-dichloroethane
µg/l: Micrograms per liter
ND: Not detected above the reporting limit
NA: Not analyzed
*: MTBE analysis by EPA Method 8020
+: MW-8D is a deep well installed to a depth of 45 ft and screened from 37.5 to 45 ft.
(1): On 1/20/06, ethanol was detected in MW-7 at 350 µg/l.

Results for other oxygenates not reported above were all ND.

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Table 8. Analytical Results - Groundwater Samples from Monitoring Wells: Volatile Organic Compounds
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	PCE µg/l	TCE µg/l	cis-1,2-DCE µg/l	n-Butyl benzene µg/l	sec-Butyl benzene µg/l	Isopropyl benzene µg/l	Naphthalene µg/l	n-Propyl benzene µg/l	1,2,4-Trimethylbenzene µg/l	1,3,5-Trimethylbenzene µg/l
MW-2	02/07/02	8.75	62	36	5.1	8.4	5.6	23	41	18	40	6.3
	07/25/02	9.75	110	ND	ND	ND	ND	52	ND	53	120	37
	10/14/02	11.61	110	ND<25	ND<25	ND<25	ND<25	46	86	38	76	26
	01/02/03	9.08	60	4.4	ND<2.5	ND<2.5	ND<2.5	7.4	3.8	4.0	ND<2.5	ND<2.5
	06/23/03	8.66	58	21	65	38	ND<17	100	120	78	130	39
	09/25/03	10.95	36	38	43	ND<25	ND<25	67	110	45	73	ND<25
	12/08/03	10.75	340	20	7.6	ND<5.0	ND<5.0	21	23	12	18	ND<5.0
	03/24/04	8.23	66	35	35	ND<25	ND<25	27	49	ND<25	36	ND<25
	06/18/04	9.86	550	ND<50	ND<50	ND<50	ND<50	ND<50	82	ND<50	ND<50	ND<50
	09/22/04	12.50	260	ND<50	310	ND<50	ND<50	ND<50	110	ND<50	ND<50	ND<50
	01/04/05 ⁽¹⁾	8.80	30	85	33	4.6	3.0	17	ND<2.5	6.3	ND<2.5	3.1
	04/19/05	7.48	41	46	52	ND<17	ND<17	18	85	17	51	ND<17
	07/08/05 ⁽¹⁾ (3)	8.88	--	28	77	31	10	71	160	69	140	49
	10/26/05	11.51	780	ND<50	ND<50	ND<50	ND<50	55	83	ND<50	84	ND<50
	01/20/06	8.46	52	43	25	ND<10	ND<10	40	45	26	51	19
	04/24/06	7.13	310	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50
	07/28/06	9.76	200	ND<50	79	ND<50	ND<50	58	120	ND<50	77	ND<50
	10/04/06	12.09	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	65	ND<50	54	ND<50
	01/09/07	9.37	ND<25	ND<25	48	ND<25	ND<25	33	32	ND<25	ND<25	ND<25

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Table 8. Analytical Results - Groundwater Samples from Monitoring Wells: Volatile Organic Compounds
18460 Sonoma Highway, Boyes Hot Springs, California

Sample ID	Sample Date	DTW ft bgs	PCE µg/l	TCE µg/l	cis-1,2-DCE µg/l	n-Butyl benzene µg/l	sec-Butyl benzene µg/l	Isopropyl benzene µg/l	Naphthalene µg/l	n-Propyl benzene µg/l	1,2,4-Trimethylbenzene µg/l	1,3,5-Trimethylbenzene µg/l
MW-4	06/23/03	7.95	170	3.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5
	09/25/03	10.08	78	1.8	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	12/08/03	10.02	48	1.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04	7.43	46	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	06/18/04	9.03	83	2.2	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	09/22/04	11.01	44	1.3	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0
	01/04/05	8.15	110	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5
	07/08/05 +	8.09	>50	3.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	10/26/05	10.60	40	1.3	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	2.3	1.1
	01/20/06	7.72	62	1.9	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7	ND<1.7
	04/24/06	6.51	38	0.90	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	07/28/06	8.96	67	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5
	10/04/06	11.18	37	1.1	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0
MW-5	01/09/07	8.47	26	0.72	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/23/03	7.60	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/25/03	9.77	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/08/03	9.74	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	03/24/04	7.14	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/18/04	8.76	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/04	13.68	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.69	3.0	0.92

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**Table 8. Analytical Results - Groundwater Samples from Monitoring Wells: Volatile Organic Compounds
18460 Sonoma Highway, Boyes Hot Springs, California**

<u>Notes</u>	
VOCs:	Volatile organic compounds analyzed by Method SW8260B. BTEX results by Method SW8260B are reported in Table 2. Except as noted below, results for other VOCs not reported above or in Table 2 were all ND. Samples collected prior to 02/07/02 were not analyzed for VOCs by Method SW8260B
DTW:	Depth to water below top of casing in feet below ground surface (ft bgs)
PCE:	Tetrachloroethene
TCE:	Trichloroethene
cis-1,2-DCE:	cis-1,2-Dichloroethene
µg/l:	Micrograms per liter
ND:	Not detected above the reporting limit
+	MW-8D is a deep well screened from 37.5 ft to 45 ft below grade
†:	Due to an error on the chain of custody, the samples collected on July 11, 2005 initially were not analyzed for VOCs other than gasoline oxygenates. After the error was discovered, the laboratory was able to recover some of the data.
-:	Unable to analyze for this compound
>:	Greater than
(1):	On 01/04/05 in MW-2, in addition to results reported above, chloroform and 4-isopropyl toluene were detected at 4.8 µg/l and 3.5 µg/l, respectively
(2):	On 04/19/05 in MW-7, in addition to results reported above, carbon disulfide was detected at 1.1 µg/l
(3):	On 07/08/05 in MW-2, in addition to results reported above, 4-isopropyl toluene was detected at 13 µg/l
(4):	On 07/08/05 in MW-6, in addition to results reported above, chloroform, trans-1,2-dichloroethene, 1,1,2-trichloroethane, chlorobenzene and 1,1,1,2-tetrachloroethane were detected at 1.2 µg/l, 0.94 µg/l, 1.8 µg/l and 16 µg/l, respectively
(5):	On 07/08/05 in MW-9, in addition to results reported above, chlorobenzene and 1,1,1,2-tetrachloroethane were detected at 2.6 µg/l and 3.5 µg/l, respectively

Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-1	135.43	04/08/99	7.90	127.53
MW-2	135.36		7.57	127.79
MW-3	133.79		8.64	125.15
Gradient: N73°W, 0.04 ft/ft				
MW-1	135.43	08/13/99	10.57	124.86
MW-2	135.36		10.33	125.03
MW-3	133.79		8.94	124.85
Gradient: N28°W, 0.004 ft/ft				
MW-1	135.43	11/18/99	11.86	123.57
MW-2	135.36		11.47	123.89
MW-3	133.79		10.46	123.33
Gradient: N42°W, 0.009 ft/ft				
MW-1	135.43	03/23/00	8.39	127.04
MW-2	135.36		9.08	126.28
MW-3	133.79		8.31	125.48
Gradient: S58°W, 0.018 ft/ft				
MW-1	135.43	10/23/01	12.66	122.77
MW-2	135.36		12.40	122.96
MW-3	133.79		12.55	121.24
Gradient: N70°W, 0.025 ft/ft				
MW-1	135.43	02/07/02	8.51	126.92
MW-2	135.36		8.75	126.61
MW-3	133.79		7.80	125.99
Gradient: S72°W, 0.011 ft/ft				
MW-1	135.43	07/25/02	9.93	125.5
MW-2	135.36		9.75	125.61
MW-3	133.79		9.02	124.77
Gradient: N70°W, 0.012 ft/ft				

Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-1	135.43	10/14/02	11.96	123.47
MW-2	135.36		11.61	123.75
MW-3	133.79		10.70	123.09
Gradient: N50°W, 0.010 ft/ft				
MW-1	135.43	01/02/03	9.21	126.22
MW-2	135.36		9.08	126.28
MW-3	133.79		7.81	125.98
Gradient: N65°W, 0.0043 ft/ft				
MW-1	135.43	06/23/03	8.90	126.53
MW-2	135.36		8.66	126.70
MW-3	133.79		8.28	125.51
MW-4	133.95		7.95	126.00
MW-5	134.68		7.60	127.08
MW-6	134.68		8.42	126.26
Gradient: N67°W, 0.017 ft/ft				
MW-1	135.43	09/25/03	11.27	124.16
MW-2	135.36		10.95	124.41
MW-3	133.79		10.05	123.74
MW-4	133.95		10.08	123.87
MW-5	134.68		9.81	124.87
MW-6	134.68		10.71	123.97
MW-7	133.06		9.44	123.62
MW-8	131.22		7.66	123.56
MW-8D*	130.93		7.92	123.01
MW-9	130.84		7.61	123.23
Gradient: N55°W, 0.011 ft/ft				

Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-1	135.43	12/08/03	11.03	124.40
MW-2	135.36		10.75	124.61
MW-3	133.79		7.38	126.41
MW-4	133.95		10.02	123.93
MW-5	134.68		9.74	124.94
MW-6	134.68		10.59	124.09
MW-7	133.06		9.18	123.88
MW-8	131.22		7.48	123.74
MW-8D*	130.93		7.46	123.47
MW-9	130.84		7.27	123.57
Gradient: N60°W, 0.012 ft/ft				
MW-1	135.43	03/24/04	8.34	127.09
MW-2	135.36		8.23	127.13
MW-3	133.79		7.81	125.98
MW-4	133.95		7.43	126.52
MW-5	134.68		7.14	127.54
MW-6	134.68		7.96	126.72
MW-7	133.06		6.73	126.33
MW-8	131.22		6.15	125.07
MW-8D*	130.93		9.87	121.06
MW-9	130.84		5.87	124.97
Gradient: N67°W, 0.016 ft/ft				
MW-1	135.43	06/18/04	10.09	125.34
MW-2	135.36		9.86	125.50
MW-3	133.79		8.93	124.86
MW-4	133.95		9.03	124.92
MW-5	134.68		8.76	125.92
MW-6	134.68		9.61	125.07
MW-7	133.06		8.25	124.81

Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-8	131.22	06/18/04 continued	7.19	124.03
MW-8D*	130.93		6.58	124.35
MW-9	130.84		6.89	123.95
Gradient: N61°W, 0.013 ft/ft				
MW-1	135.43	09/22/04	12.39	123.04
MW-2	135.36		12.50	122.86
MW-3	133.79		11.10	122.69
MW-4	133.95		11.01	122.94
MW-5	134.68		13.68	121.00
MW-6	134.68		11.83	122.85
MW-7	133.06		10.58	122.48
MW-8	131.22		9.31	121.91
MW-8D*	130.93		14.01	116.92
MW-9	130.84	8.65	122.19	
Gradient **: S77°E, 0.091 ft/ft and N44°W, 0.011 ft/ft				
MW-1	135.43	01/04/05	8.96	126.47
MW-2	135.36		8.80	126.56
MW-3	133.79		8.34	125.45
MW-4	133.95		8.15	125.80
MW-5	134.68		8.00	126.68
MW-6	134.68		8.62	126.06
MW-7	133.06		7.04	126.02
MW-8	131.22		6.19	125.03
MW-8D*	130.93		16.56	114.37
MW-9	130.84	6.05	124.79	
Gradient: N81°W, 0.012 ft/ft				

**Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California**

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-1	135.43	4/19/05	7.69	127.74
MW-2	135.36		7.48	127.88
MW-3	133.79		7.92	125.87
MW-4	133.95		6.44	127.51
MW-5	134.68		6.44	128.24
MW-6	134.68		7.22	127.46
MW-7	133.06		5.75	127.31
MW-8	131.22		5.59	125.63
MW-8D*	130.93		15.49	115.44
MW-9	130.84		5.59	125.25
Gradient: N75°W, 0.017ft/ft				
MW-1	135.43	07/08/05	9.03	126.40
MW-2	135.36		8.88	126.48
MW-3	133.79		8.42	125.37
MW-4	133.95		8.09	125.86
MW-5	134.68		7.81	126.87
MW-6	134.68		8.60	126.08
MW-7	133.06		7.16	125.90
MW-8	131.22		6.38	124.84
MW-8D*	130.93		17.10	113.83
MW-9	130.84		6.14	124.70
Gradient: N76°W, 0.012 ft/ft				
MW-1	135.43	10/26/05	11.80	123.63
MW-2	135.36		11.51	123.85
MW-3	133.79		10.62	123.17
MW-4	133.95		10.60	123.35
MW-5	134.68		10.29	124.39
MW-6	134.68		11.32	123.36
MW-7	133.06		10.07	122.99

Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-8	131.22	10/26/05 continued	8.84	122.38
MW-8D*	130.93		21.16	109.77
MW-9	130.84		8.37	122.47
Gradient: N50°W, 0.013 ft/ft				
MW-1	135.43	01/20/06	8.60	126.83
MW-2	135.36		8.46	126.90
MW-3	133.79		8.12	125.67
MW-4	133.95		7.72	126.23
MW-5	134.68		7.48	127.20
MW-6	134.68		8.23	126.45
MW-7	133.06		6.60	126.46
MW-8	131.22		6.16	125.06
MW-8D*	130.93		23.58	107.35
MW-9	130.84		6.04	124.80
Gradient: N78°W, 0.017 ft/ft				
MW-1	135.43	04/24/06	7.32	128.11
MW-2	135.36		7.13	128.23
MW-3	133.79		6.71	127.08
MW-4	133.95		6.51	127.44
MW-5	134.68		5.99	128.69
MW-6	134.68		6.95	127.73
MW-7	133.06		5.77	127.29
MW-8	131.22		5.65	125.57
MW-8D*	130.93		12.89	118.04
MW-9	130.84		5.50	125.34
Gradient: N72°W, 0.015 ft/ft				

**Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California**

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-1	135.43	07/28/06	9.98	125.45
MW-2	135.36		9.76	125.60
MW-3	133.79		9.09	124.70
MW-4	133.95		8.96	124.99
MW-5	134.68		8.63	126.05
MW-6	134.68		9.50	125.18
MW-7	133.06		8.17	124.89
MW-8	131.22		6.17	125.05
MW-8D*	130.93		20.12	110.81
MW-9	130.84		6.95	123.89
Gradient: N64°W, 0.013 ft/ft				
MW-1	135.43	10/03/06	12.35	123.08
MW-2	135.36		12.09	123.27
MW-3	133.79		11.17	122.62
MW-4	133.95		11.18	122.77
MW-5	134.68		10.85	123.83
MW-6	134.68		11.88 ⁽¹⁾	122.80
MW-7	133.06		10.57	122.49
MW-8	131.22		9.37	121.85
MW-8D*	130.93		16.63	114.30
MW-9	130.84		8.93	121.91
Gradient: N57°W, 0.012 ft/ft				
MW-1	135.43	01/09/07	9.27	126.16
MW-2	135.36		9.37	125.99
MW-3	133.79		7.65 ⁽²⁾	126.14
MW-4	133.95		8.47	125.48
MW-5	134.68		8.33	126.35
MW-6	134.68		8.92	125.76
MW-7	133.06		7.31	125.75

Table 9. Groundwater Elevation Data
18460 Sonoma Highway, Boyes Hot Springs, California

Well ID	TOC Elevation feet msl	Date	Depth to Water feet	Groundwater Elevation feet msl
MW-8	131.22	01/09/07 continued	6.54	124.68
MW-8D*	130.93		17.94	112.99
MW-9	130.84		6.42	124.42
Gradient: N83°W, 0.008 ft/ft				

TOC: Top of casing

feet msl: Measured in feet relative to mean sea level

*: The groundwater elevation in well MW-8D is not used to calculate the gradient because MW-8D is a deep well screened from 37.5 ft to 45 ft bgs

**: On September 22, 2004, the gradient near the vicinity of the former USTs was to the southeast; the gradient in the west portion of the site and offsite to the west was to the northwest.

(1): Depth to water in MW-6 was measured on 10/04/06; all other wells were measured on 10/03/06.

(2): The measured groundwater elevation in MW-3 on 01/09/07 was anomalously high and was not used to calculate groundwater-flow direction or gradient.

**Table 10 Analytical Results - Groundwater Samples from Water-supply Well: Fuel Hydrocarbons, MTBE, Other Oxygenates, Lead Scavengers, and Volatile Organic Compounds
18460 Sonoma Highway, Boyes Hot Springs, California**

Sample ID	Sample Date	TPHg µg/l	Benzene µg/l	Toluene µg/l	Ethyl- benzene µg/l	Xylenes µg/l	MTBE µg/l	EDB µg/l	PCE µg/l
DW-1	05/29/04 *	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.9	2.0
	06/30/04 *	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.6	1.2
	09/30/04 *	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.72	0.71
	01/04/05 *	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.4
	04/21/05 *	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	2.2	2.6
	07/08/05 *	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.7	--
	10/26/05 *	NA	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.70	0.86
	01/20/06 *	NA	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.1	1.4
	04/24/06 *	NA	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.9	1.4
	07/28/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.3	0.96
	10/04/06	NA	NA	NA	NA	NA	NA	1.1	1.3
	01/09/07	NA	NA	NA	NA	NA	NA	1.4	0.86

- Water-supply well DW-1 is located at 16 West Thompson Avenue, Boyes Hot Springs
- Results for other gasoline oxygenates, lead scavengers and volatile organic compounds not reported above were all ND.

TPHg: Total petroleum hydrocarbons as gasoline

MTBE: Methyl tert-butyl ether; analyzed by Method SW8260B unless noted otherwise

EDB: 1,2-dibromoethane

PCE: Tetrachloroethene

µg/l: Micrograms per liter

*: Benzene, toluene, ethylbenzene and xylenes analysis by Method SW8260B

ND: Not detected above the reporting limit

NA: Not analyzed

--: Unable to analyze for PCE

**Table 11. Estimated Mass of Fuel Hydrocarbons Remaining in Soil
18460 Sonoma Highway, Boyes Hot Springs, California**

Benzene	Contour Interval 1	Contour Interval 2	Contour Interval 2		Total (kg)
Average Concentration (mg/kg)	0.025	0.25	2.2		
Soil Volume (cubic feet) [†]	50,400	21,700	10,600		
Soil Volume (cubic meters)	1430	615	299		
Soil Mass (kg)	3,140,000	1,350,000	658,000		
Benzene Mass (kg)	0.1	0.3	1.5		1.9

TPHg	Contour Interval 1	Contour Interval 2	Contour Interval 2	Contour Interval 4	Total (kg)
Average Concentration (mg/kg)	5	50	500	1600	
Soil Volume (cubic feet) [†]	25,100	8,300	16,600	8,290	
Soil Volume (cubic meters)	711	235	470	235	
Soil Mass (kg)	1,560,000	517,000	1,030,000	517,000	
TPHg Mass (kg)	7.8	25.9	517	826	1380

*: Native soil density is assumed to be 2.2 g/cm³

†: Smear zone is assumed to be 10 ft thick.

Appendix A

Soil & Well Boring Logs

BORING LOCATION		18460 Sonoma Highway, Boyes Hot Springs		ELEVATION AND DATUM		BORING NO. B-1	
DRILLING AGENCY		Clear Heart Drilling		DRILLER GS		DATE STARTED 11/10/97 → DATE FINISHED 11/10/97	
DRILLING EQUIPMENT		Truck Mounted Drill Rig/Hammer Weight: 140 lbs		COMPLETION DEPTH 25 ft bgs		SAMPLER Split Spoon	
DRILLING METHOD		4" Solid Flight Auger		BORING DIA. 4"		NO. OF SAMPLES 4 Soil & 1 Grab groundwater	
SIZE AND TYPE OF CASING		— NA		FROM TO		WATER LEVEL FIRST 21.0' bgs BEFORE SAMPLE 19.2' bgs	
TYPE OF PERFORATION		— NA		FROM TO		CORE BARREL 2 inches LENGTH 18 inches	
SIZE AND TYPE OF PACK		— NA		FROM TO		LOGGED BY: EC&A, JC CHECKED BY: CYP	
TYPE OF SEAL	NO. 1 — NA		FROM TO		COMMENTS Soil samples field screened with GasTechtor Combustion Meter (GT), Results reported in parts per million (ppm)		
	NO. 2 — NA		FROM TO				

DEPTH (feet)	Samples	GT	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
				Asphalt (1 inch), Concrete (1 inch)		
				Silty Clayey Sand (SC), brown (7.5YR 4/3).	SC	
				Silty Sand (SM), yellow brown (10YR 5/3).	SM	
5	⊗	0	25	Clayey Sandy Silt (ML), light grayish brown with orange mottling; hard, moist, little gravel; few organic materials.	ML	
	⊗		50			
			4"			
10	⊗	0	12	Silty Sand (SM), light olive brown (2.5Y 5/3) with orange mottling; dense, very moist, little gravel; few organic materials.	SM	
	⊗		16			
			27			
15	⊗	0	40	Very dense, some clay, 3-inch-thick gravel lens; no organic material.		
	⊗		50			
			4"			
20	⊗	0	14	Dense.		
	⊗		16			
			27	Wet.		

TD: 25 ft bgs

Note: Grab groundwater sample collected through temporary well screen.

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LOG OF BORING B-1
 18460 Sonoma Highway
 Boyes Hot Springs, California

PLATE
 3

JOB NUMBER	0268,002.96	REVIEWED BY	CYP	DATE	April 98	REVISED DATE		SHEET NO.	1 of 1
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BORING LOCATION		18460 Sonoma Highway, Boyes Hot Springs		ELEVATION AND DATUM		BORING NO. B-2	
DRILLING AGENCY		Clear Heart Drilling		DRILLER GS		DATE STARTED 11/10/97 → 11/10/97	
DRILLING EQUIPMENT		Truck Mounted Drill Rig/Hammer Weight: 140 lbs		COMPLETION DEPTH 25 ft bgs		SAMPLER Split Spoon	
DRILLING METHOD		4" Solid Flight Auger		BORING DIA. 4"		NO. OF SAMPLES 3 soil & 1 Grab groundwater	
SIZE AND TYPE OF CASING		— NA		FROM TO		WATER LEVEL FIRST 23.5' bgs BEFORE SAMPLE 23.28' bgs	
TYPE OF PERFORATION		— NA		FROM TO		CORE BARREL 2 inches LENGTH 18 inches	
SIZE AND TYPE OF PACK		— NA		FROM TO		LOGGED BY: EC&A, JC CHECKED BY: CYP	
TYPE OF SEAL	NO. 1	— NA		FROM TO		COMMENTS Soil samples field screened with GasTechtor Combustion Meter (GT), Results reported in parts per million (ppm)	
	NO. 2	— NA		FROM TO			

DEPTH (feet)	Samples	GT	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
				Asphalt (1 inch), Concrete (3 inches); base rock.		
				Silty Clayey Sand (SC), brown (7.5YR 5/3).	SC	
				Silty Sand (SM), yellowish brown (10YR 5/3); some clay.	SM	
5	⊗	0	50	Silty Sandy Gravel (GM), olive yellow (2.5Y 6/6); very dense; moist.	GM	
			6"			
10	⊗	150	22	Silty Sand (SM), light olive brown (2.5Y 5/4), very dense; moist; fine grained sand, with little gravel and petroleum hydrocarbon odor.	SM	
			30			
15	⊗	500	23	▼ Black mottling; cementation.		
			28			
20	⊗	0	27	▼ Dark grayish brown (2.5Y 4/2); no mottling.		
			42			
				Driller estimates groundwater at 23.5 ft bgs.		
				TD: 25 ft bgs		

Note: Grab groundwater sample collected through temporary well screen.

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LOG OF BORING B-2
18460 Sonoma Highway
Boyes Hot Springs, California

PLATE
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JOB NUMBER	0268,002.96	REVIEWED BY	CYP	DATE	April 98	REVISED DATE	SHEET NO. 1 of 1
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BORING LOCATION		18460 Sonoma Highway, Boyes Hot Springs		ELEVATION AND DATUM		BORING NO. B-3	
DRILLING AGENCY		Clear Heart Drilling		DRILLER GS		DATE STARTED 11/10/97 → 11/10/97	
DRILLING EQUIPMENT		Truck Mounted Drill Rig/Hammer Weight: 140 lbs		COMPLETION DEPTH 25 ft bgs		SAMPLER Split Spoon	
DRILLING METHOD		4" Solid Flight Auger		BORING DIA. 4"		NO. OF SAMPLES 3 soil & 1 Grab groundwater	
SIZE AND TYPE OF CASING		— NA		FROM TO		WATER LEVEL FIRST 20.5' bgs BEFORE SAMPLE 18.66' bgs	
TYPE OF PERFORATION		— NA		FROM TO		CORE BARREL 2 inches LENGTH 18 inches	
SIZE AND TYPE OF PACK		— NA		FROM TO		LOGGED BY: EC&A, JC CHECKED BY: CYP	
TYPE OF SEAL		NO. 1 — NA		FROM TO		COMMENTS Soil samples field screened with GasTechtor Combustion Meter (GT), Results reported in parts per million (ppm)	
		NO. 2 — NA		FROM TO			

DEPTH (feet)	Samples	GT	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
				Asphalt, base rock.		
				Clayey Sand (SC), dark brown (7.5YR 3/3); moist.	SC	
				▼ Olive brown, (2.5Y 5/4); very moist with little gravel.		
5	×	0	25 50	Silty Sand (SM), light olive brown (2.5Y 5/4); very dense; moist; little gravel; cementation.	SM	
10	×	100	14 37	▼ Dense; petroleum hydrocarbon odor.		
15		50	23 50	▼ Very dense.		
20	×	0	26 50	▼ Wet; increased gravel.		
				TD: 25 ft bgs		

Note: Grab groundwater sample collected through temporary well screen.

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LOG OF BORING B-3
18460 Sonoma Highway
Boyes Hot Springs, California

PLATE
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JOB NUMBER	0268,002.96	REVIEWED BY	CYP	DATE	April 98	REVISED DATE	SHEET NO. 1 of 1
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BORING LOCATION		18460 Sonoma Highway, Boyes Hot Springs		ELEVATION AND DATUM		BORING NO. B-4	
DRILLING AGENCY		Clear Heart Drilling		DRILLER GS		DATE STARTED 11/10/97 → 11/10/97	
DRILLING EQUIPMENT		Truck Mounted Drill Rig/Hammer Weight: 140 lbs		COMPLETION DEPTH 25 ft bgs		SAMPLER Split Spoon	
DRILLING METHOD		4" Solid Flight Auger		BORING DIA. 4"		NO. OF SAMPLES 3 soil & 1 Grab groundwater	
SIZE AND TYPE OF CASING		— NA		FROM TO		WATER LEVEL FIRST 15.5' bgs BEFORE SAMPLE 19.0' bgs	
TYPE OF PERFORATION		— NA		FROM TO		CORE BARREL 2 inches LENGTH 18 inches	
SIZE AND TYPE OF PACK		— NA		FROM TO		LOGGED BY: EC&A, JC CHECKED BY: CYP	
TYPE OF SEAL		NO. 1 — NA		FROM TO		COMMENTS Soil samples field screened with GasTechtor Combustion Meter (GT), Results reported in parts per million (ppm)	
		NO. 2 — NA		FROM TO			

DEPTH (feet)	Samples	GT	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
				Asphalt, base rock.		
				Clayey Sand (SC), dark brown (7.5YR 3/3); moist.	SC	
				▽ Olive brown, (2.5Y 5/4); very moist with little gravel.		
5	×		29			
	×		42	Silty Sand (SC), olive brown (2.5Y 4/4); very dense; slightly moist; little gravel; cementation.	SM	
10	×		25			
	×		50	▽ Dark, yellowish brown (10YR 4/6); moist; little clay.		
			4"			
15	×		55	▽ Wet; trace clay, increased gravel.		
20	×		0			
	×		31	▽ Very moist.		
			50			
			3"			

Note: Grab groundwater sample collected through temporary well screen.

TD: 25 ft bgs

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LOG OF BORING B-4
18460 Sonoma Highway
Boyes Hot Springs, California

PLATE
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JOB NUMBER	0268,002.96	REVIEWED BY	CYP	DATE	April 98	REVISED DATE	SHEET NO. 1 of 1
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JOB NUMBER	0268,002.96	REVIEWED BY	CYP	DATE	April 98	REVISED DATE	SHEET NO. 1 of 1
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BORING LOCATION				18460 Sonoma Highway, Boyes Hot Springs		ELEVATION AND DATUM		BORING NO. B-6	
DRILLING AGENCY				Clear Heart Drilling		DRILLER		GS	
DATE STARTED				11/24/97		DATE FINISHED 11/24/97			
DRILLING EQUIPMENT				Tight Access Rig		COMPLETION DEPTH		22 ft bgs	
SAMPLER				Split Spoon					
DRILLING METHOD				4" Solid Flight Auger		BORING DIA.		4"	
NO. OF SAMPLES				2 soil & 1 Grab groundwater					
SIZE AND TYPE OF CASING				— NA		FROM		TO	
WATER LEVEL				FIRST 20.5' bgs		BEFORE SAMPLE 17.83' bgs			
TYPE OF PERFORATION				— NA		FROM		TO	
CORE BARREL				2 inches		LENGTH 18 inches			
SIZE AND TYPE OF PACK				— NA		FROM		TO	
LOGGED BY:				EC&A, JC		CHECKED BY: CYP			
TYPE OF SEAL				NO. 1 — NA		FROM		TO	
NO. 2 — NA				FROM		TO			
COMMENTS				Soil samples field screened with GasTechtor Combustion Meter (GT), Results reported in parts per million (ppm)					

DEPTH (feet)	Samples	GT	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
				Building interior. Concrete slab floor 4-inches.		
				Sandy Clayey Silt (ML), reddish brown (5YR 4/4); moist.	ML	
				▼ Yellowish brown (10YR 5/4); very moist.		
5	☒	0	50	Silty Gravelly Sand (SM), yellowish brown (10YR 5/6); very dense; very moist.	SM	
			6"	Driller reports gravel lens from 7' to 7.5' bgs.	GM?	
					SM	
10	☒	0	17	Clayey Silty Sand ((SM), light olive brown (2.5Y 5/4); very dense; moist; little gravel.		
			40			
15	☒	0	27	▼ Very moist; no clay.		
			45			
			5"			
20				▼ Wet; little clay.		
				TD: 22 ft bgs		

Note: Grab groundwater sample collected through temporary well screen.

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LOG OF BORING B-6
18460 Sonoma Highway
Boyes Hot Springs, California

PLATE

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JOB NUMBER	0268,002.96	REVIEWED BY	CYP	DATE	April 98	REVISED DATE	SHEET NO. 1 of 1
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BORING LOCATION			18460 Sonoma Hwy (~30 ft west of MW-3).		ELEVATION AND DATUM		Ground Surface		BORING NO.		B-7	
DRILLING AGENCY			Clear Heart, Inc.		DRILLER		Rick		DATE STARTED		12 Sep 03	
DRILLING EQUIPMENT			CME-75 Rig		DATE FINISHED		12 Sep 03		COMPLETION DEPTH		21.0 ft	
DRILLING METHOD			Solid Flight Auger		BORING DIA.		4.0 inches		NO. OF SAMPLES		4 Soil, 1 Groundwater	
SIZE AND TYPE OF CASING			FROM — TO —		WATER LEVEL		FIRST ~16.5 ft bgs		MEASURED / SAMPLED		DTW 15 ft	
TYPE OF PERFORATION			FROM — TO —		CORE BARREL		2.0 inch ϕ		LENGTH		18 inches	
SIZE AND TYPE OF PACK			FROM — TO —		LOGGED BY:		EAP		CHECKED BY:		RWE	
TYPE OF SEAL			NO. 1 FROM — TO —		NO. 2 FROM — TO —		COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm).					
DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION				USCS	WELL CONSTRUCTION		
					Approx. 2 inches of asphalt.							
5		6.0	27	0	SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), slightly moist, stiff; ~50% silt, ~40% fine-grained sand, ~10% clay.				ML			
10		11.0	28	0	▼ Same as above, except increase in moisture.							
15		16.0	29	0.6	▼ Same as above, except wet, slightly less sand and increase in clay.							
20		21.0	45	0.5	▼ Same as above, except saturated.							
					TD: 21.0 ft bgs							
					Note: Temporary well screen installed; grab groundwater sample collected at ~15 ft bgs at 1325 hr.							

(TRACE #319/RG/30Sep03)

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING B-7
 18460 Sonoma highway
 Boyes Hot Springs, California

PLATE

3

JOB NUMBER	0268,002.96	REVIEWED BY	EC&A, Elizabeth Perry	DATE	September 2003	REVISED		SHEET NO.	1 of 1
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BORING LOCATION		18460 Sonoma Highway (northeast corner of building)		ELEVATION AND DATUM		TOC 135.43 ft		BORING NO.		MW-1	
DRILLING AGENCY		Clear Heart, LLC		DRILLER		DC		DATE STARTED		31 Mar 99	
DATE FINISHED		31 Mar 99		COMPLETION DEPTH		25.0 ft		SAMPLER		CA Modified Split Spoon	
DRILLING EQUIPMENT		DR 10K Truck-mounted Drill Rig		NO. OF SAMPLES		4 Soil Samples					
DRILLING METHOD		Hollow Stem Auger		BORING DIA.		8 inches		WATER LEVEL		FIRST 16.0 ft	
SIZE AND TYPE OF CASING		2 inch Schedule 40 PVC		FROM 0.0 ft TO 25.0 ft				BEFORE SAMPLE		9.8 ft	
TYPE OF PERFORATION		0.01 inch slotted		FROM 10.0 ft TO 25.0 ft		CORE BARREL		2.5 inch ϕ		LENGTH 18 inches	
SIZE AND TYPE OF PACK		2/12 Lonestar Sand		FROM 8.5 ft TO 25.0 ft		LOGGED BY:		JC		CHECKED BY: CP, RG#5288	
TYPE OF SEAL		NO. 1 Bentonite		FROM 6.5 ft TO 8.5 ft		COMMENTS		Soil samples field screened with Photo-Ionization Detector (PID). Results reported in parts per million (ppm).			
		NO. 2 Cement Grout		FROM 0.0 ft TO 6.5 ft							

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Asphalt (1 inch) and concrete (4 inches).		Christy Box
					CLAYEY SAND (SC) with silt, dark reddish brown (5YR 3/3), moist, 50% fine-grained sand, 35% clay, 15% silt.	SC	Grout
					▽ Brown (10YR 4/3), gravel, wood debris.		
5	■	5.5	0	63 (5")	SILTY SAND (SM) with clay and gravel, light brownish gray (10YR 6/3), slightly moist to wet, very dense, 50% fine- to coarse-grained sand, 30% silt, 10% clay, 10% gravel.	SM	2" PVC
					I Orange mottling at 6.5 ft.		Bentonite
10	■	11.0	0	35	▽ Dark yellowish brown (10YR 4/4), dense, 70% fine- to coarse-grained sand, 20% silt, 5% clay, 5% gravel.		0.010 Well Screen
15	■	16.0	0	62	▽ Brown (10YR 4/3), moist, very dense, 50% fine- to coarse-grained sand, 25% gravel, 25% silt.		
					▽ Wet (very little free water).		
20	■	21.0	0	38	▽ Moist, dense, 50% fine-grained sand, 40% silt, 10% clay.		
					Note: Water in boring.		
					Note: Water at 9.8 ft below toc (after drilling completed).		
					TD: 25.0 ft bgs		

(TRACE #143/RG/ASep99)

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-1
18460 Sonoma Highway
Boyes Hot Springs, California

PLATE
3

JOB NUMBER	0268,002.96	REVIEWED BY	John Calomiris	DATE	August 1999	REVISED		SHEET NO.	1 of 1
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BORING LOCATION		18460 Sonoma Highway (south side of building in driveway)		ELEVATION AND DATUM		TOC 135.36 ft		BORING NO.		MW-2	
DRILLING AGENCY		Clear Heart, LLC		DRILLER		DC		DATE STARTED		31 Mar 99	
DATE FINISHED		31 Mar 99		COMPLETION DEPTH		20.5 ft		SAMPLER		CA Modified Split Spoon	
DRILLING EQUIPMENT		DR 10K Truck-mounted Drill Rig		NO. OF SAMPLES		3 Soil Samples		TYPE OF PERFORATION		0.01 inch slotted	
DRILLING METHOD		Hollow Stem Auger		BORING DIA.		8 inches		SIZE AND TYPE OF CASING		2 inch Schedule 40 PVC	
FROM		0.0 ft TO 20.0 ft		WATER LEVEL		FIRST 15.0 ft		BEFORE SAMPLE		8.4 ft	
TYPE OF PERFORATION		0.01 inch slotted		FROM		10.0 ft TO 20.0 ft		CORE BARREL		2.5 inch ϕ	
LENGTH		18 inches		LOGGED BY:		JC		CHECKED BY:		CP, RG#5288	
SIZE AND TYPE OF PACK		2/12 Lonestar Sand		FROM		9.0 ft TO 20.5 ft		COMMENTS		Soil samples field screened with Photo-Ionization Detector (PID). Results reported in parts per million (ppm).	
TYPE OF SEAL		NO. 1 Bentonite		FROM		7.0 ft TO 9.0 ft		TYPE OF SEAL		NO. 2 Cement Grout	
FROM		0.0 ft TO 7.0 ft		TYPE OF SEAL		NO. 2 Cement Grout		FROM		0.0 ft TO 7.0 ft	

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
			550		Asphalt (2 inches).		Christy Box
					CLAYEY SAND (SC) with silt, brown (7YR 4/3), moist, 60% fine- to medium-grained sand, 30% clay, 10% silt.	SC	
					CLAYEY GRAVEL (GC), moist, gravel to 2 inches dia.	GC	Grout
					CLAYEY SAND (SC) with silt, yellowish brown (10YR 5/4) wet (perched water).	SC	
5		6.0	0	67	SILTY SAND (SM) with gravel, yellowish brown (10YR 5/4), moist to wet, very dense, 60% fine- to medium-grained sand, 30% silt, 10% gravel.	SM	2" PVC
10		11.0	16	42 50 (4")	▽ No gravel, 40% silt, slight hydrocarbon odor.		Bentonite
15		16.0	0	51 50 (4")	▽ Brown (10YR 5/3), wet, 50% fine- to medium-grained sand, 25% silt, 25% gravel.		0.010 Well Screen
20					▽ Damp, 70% fine-grained sand 30% silt, indurated.		Sand
					TD: 20.5 ft bgs	Note: Monitoring well set at 20 ft. Water at 8.40 ft below toc (after drilling completed).	

(TRACE #143/RG/3Sep99)

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-2
 18460 Sonoma Highway
 Boyes Hot Springs, California

PLATE

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JOB NUMBER	0268,002.96	REVIEWED BY	John Calomiris	DATE	August 1999	REVISED	SHEET NO. 1 of 1
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BORING LOCATION		18460 Sonoma Highway (northwest corner of building)		ELEVATION AND DATUM TOC 133.79 ft		BORING NO. MW-3	
DRILLING AGENCY		Clear Heart, LLC		DRILLER DC		DATE STARTED DATE FINISHED 01 Apr 99 → 01 Apr 99	
DRILLING EQUIPMENT		DR 10K Truck-mounted Drill Rig		COMPLETION DEPTH 25.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD		Hollow Stem Auger		BORING DIA. 8 inches		NO. OF SAMPLES 4 Soil Samples	
SIZE AND TYPE OF CASING		2 inch Schedule 40 PVC		FROM 0.0 ft TO 25.0 ft		WATER LEVEL FIRST 16.5 ft BEFORE SAMPLE 5.6 ft	
TYPE OF PERFORATION		0.01 inch slotted		FROM 10.0 ft TO 25.0 ft		CORE BARREL 2.5 inch φ LENGTH 18 inches	
SIZE AND TYPE OF PACK		2/12 Lonestar Sand		FROM 8.0 ft TO 25.0 ft		LOGGED BY: JC CHECKED BY: CP, RG#5288	
TYPE OF SEAL		NO. 1 Bentonite		FROM 6.0 ft TO 8.0 ft		COMMENTS Soil samples field screened with Photo-Ionization Detector (PID). Results reported in parts per million (ppm).	
		NO. 2 Cement Grout		FROM 0.0 ft TO 6.0 ft			

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
			550		Asphalt (4 inches).		Christy Box
					CLAYEY SILTY SAND (SC), dark brown (7YR 3/3), moist, 50% fine- to medium-grained sand, 25% clay, 25% silt.	SC	Grout
5		6.0	0	80	SANDY GRAVEL (GW) with clay, brown (10YR 5/3), wet (perched water), very dense.	GW	2" PVC
					SILTY SAND (SM) brown (10YR 6/3), moist, very dense, 60% fine- to medium-grained sand, 35% silt, 5% clay.	SM	Bentonite
10		10.5	0	50			0.010 Well Screen
					Note: Boring dry at 15 ft.		
15		16.5	0	59	SANDY SILT (ML) with clay, light olive brown (2.5Y 5/3), moist, hard, 50% silt, 35% fine-grained sand, 15% clay. Wet.	ML	
					Note: Boring dry at 20 ft.		
20		21.0	0	68(10")	GRAVELLY SILTY SAND (SM), dark yellowish brown (10YR 4/4), wet, very dense, 50% fine- to medium-grained sand, 30% gravel, 20% silt.	SM	
					Note: Water at 5.6 ft below toc (after drilling completed).		
					TD: 25.0 ft bgs		

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-3
18460 Sonoma Highway
Boyes Hot Springs, California

PLATE

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JOB NUMBER	0268,002.96	REVIEWED BY	John Calomiris	DATE	August 1999	REVISED	SHEET NO. 1 of 1
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(TRACE #143/RG/3Scp99)

BORING LOCATION				18460 Sonoma Hwy. (~85 ft southwest of MW-2)		ELEVATION AND DATUM		TOC 133.95 ft		BORING NO.		MW-4	
DRILLING AGENCY				Clear Heart, Inc.		DRILLER		Chris		DATE STARTED		18 Jun 03	
DATE FINISHED				18 Jun 03		COMPLETION DEPTH		20.5 ft		SAMPLER		CA Modified Split Spoon	
DRILLING EQUIPMENT				Deep Rock DR10K truck-mounted rig		NO. OF SAMPLES		4 Soil					
DRILLING METHOD				Hollow Stem Auger		BORING DIA.		8.0 inches					
SIZE AND TYPE OF CASING				2.0 inch Schedule 40 PVC		FROM		0.0 ft TO 20.0 ft		WATER LEVEL		FIRST ~10 ft MEASURED / SAMPLED	
TYPE OF PERFORATION				0.010 inch slotted		FROM		5.0 ft TO 20.0 ft		CORE BARREL		2.0 inch ϕ LENGTH 18 inches	
SIZE AND TYPE OF PACK				#2/12 Sand		FROM		4.0 ft TO 20.5 ft		LOGGED BY:		EAP CHECKED BY: RWE	
TYPE OF SEAL		NO. 1		Bentonite Chips		FROM		2.0 ft TO 4.0 ft		COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm).			
		NO. 2		Portland Cement Grout		FROM		0.0 ft TO 2.0 ft					

DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Approx. 4 inches of asphalt.		Lock Box
							Grout
							Bentonite
5		5.0	74 (9")	0	SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), slightly moist, very stiff; ~50% silt, ~40% fine- to medium-grained sand, ~10% clay.	ML	2" PVC
10		10.0	59	0	Same as above, except olive-brown (2.5Y 4/4), moist.	SM	Well Screen
15		15.0	91 (11")	0	SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), saturated, very stiff; ~50% silt, ~40% fine- to medium-grained sand, ~10% clay.	ML	
20		20.5	70 (9")	0	SILTY SAND (SM) with Gravel, light yellowish-brown (2.5Y 6/4), very dense; ~65% fine- to medium-grained sand, ~30% silt, ~5% subrounded gravel up to 2 cm dia.	SM	
					TD: 20.5 ft bgs		

(TRACE #319/RG/22Oct03)

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-4
18460 Sonoma highway
Boyes Hot Springs, California

PLATE

4

JOB NUMBER	0268,002.96	REVIEWED BY	EC&A, Elizabeth Perry	DATE	July 2003	REVISED		SHEET NO.	1 of 1
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BORING LOCATION				18460 Sonoma Hwy. (~40 ft southwest of MW-2)				ELEVATION AND DATUM				TOC 134.68 ft				BORING NO.				MW-5																			
DRILLING AGENCY				Clear Heart, Inc.				DRILLER				Chris				DATE STARTED				18 Jun 03				DATE FINISHED				18 Jun 03											
DRILLING EQUIPMENT				Deep Rock DR10K truck-mounted rig				COMPLETION DEPTH				21.0 ft				SAMPLER				CA Modified Split Spoon																			
DRILLING METHOD				Hollow Stem Auger				BORING DIA.				8.0 inches				NO. OF SAMPLES				4 Soil																			
SIZE AND TYPE OF CASING				2.0 inch Schedule 40 PVC				FROM				0.0 ft TO				20.0 ft				WATER LEVEL				FIRST				~15 ft				MEASURED / SAMPLED							
TYPE OF PERFORATION				0.010 inch slotted				FROM				5.0 ft TO				20.0 ft				CORE BARREL				2.0 inch ϕ				LENGTH				18 inches							
SIZE AND TYPE OF PACK				#2/12 Sand				FROM				4.0 ft TO				21.0 ft				LOGGED BY:				EAP				CHECKED BY:				RWE							
TYPE OF SEAL				NO. 1				Bentonite Chips				FROM				2.0 ft TO				4.0 ft				COMMENTS				Soil samples field screened with Photo-ionization Detector (PID), results in parts per million (ppm).											
				NO. 2				Portland Cement Grout				FROM				0.0 ft TO				2.0 ft																			

DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Approx. 3 inches of asphalt.		Lock Box
					SILTY GRAVEL (GM), volcanic cobbles in red silty matrix encountered to 3.5 ft bgs.	GM	Grout
					SILTY CLAY (CL) with Sand (weathered volcanic rock?), light olive-brown (2.5Y 5/4), slightly moist, very stiff; ~55% clay, ~35% silt, ~10% fine- to medium-grained sand.	CL	Bentonite
5		6.0	84 (11")	0			2" PVC
10		10.5	47	0	Same as above, except moist.		Well Screen
15		15.0	65	0	SANDY SILT (ML) with Clay, olive-brown (2.5Y 4/4), wet, stiff to very stiff; ~50% silt, ~40% very fine-grained sand, ~10% clay.	ML	Sand
20		20.5	82	0	Same as above, except soil temperature is cold; slightly less sand content, and increase in clay.		
					TD: 21.0 ft bgs		

(TRACE #319)RG/2200003

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-5

18460 Sonoma highway
 Boyes Hot Springs, California

PLATE

5

JOB NUMBER	0268,002.96	REVIEWED BY	EC&A, Elizabeth Perry	DATE	July 2003	REVISED		SHEET NO.	1 of 1
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BORING LOCATION 18460 Sonoma Hwy. (~65 ft NNW of MW-2, opposite bldg.)				ELEVATION AND DATUM TOC 134.68 ft		BORING NO. MW-6	
DRILLING AGENCY Clear Heart, Inc.		DRILLER Chris		DATE STARTED 18 Jun 03		DATE FINISHED 19 Jun 03	
DRILLING EQUIPMENT Portable Rig				COMPLETION DEPTH 22.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD Solid Flight; Solid Stem Auger		BORING DIA. 4.0 inches; 6.0 inches		NO. OF SAMPLES 3 Soil			
SIZE AND TYPE OF CASING 2.0 inch Schedule 40 PVC		FROM 0.0 ft TO 20.0 ft		WATER LEVEL FIRST ~4 ft; ~15 ft		MEASURED / SAMPLED	
TYPE OF PERFORATION 0.010 inch slotted		FROM 5.0 ft TO 20.0 ft		CORE BARREL 2.0 inch ϕ		LENGTH 18 inches	
SIZE AND TYPE OF PACK #2/12 Sand		FROM 4.0 ft TO 22.0 ft		LOGGED BY: EAP		CHECKED BY: RWE	
TYPE OF SEAL		NO. 1 Bentonite Chips		FROM 2.0 ft TO 4.0 ft		COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm).	
		NO. 2 Portland Cement Grout		FROM 0.0 ft TO 2.0 ft			

DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Soil and gravel at surface.		Lock Box
					Perched water.		Grout
5	■	5.5	50 (5")	0	SILTY GRAVEL (CL) with Sand, yellowish-brown (10YR 3/4), saturated, very dense; ~40% subrounded gravel up to 1 inch dia., ~35% fine-to medium-grained sand, ~25% silt. [Fill]	GM	Bentonite
10	■	10.5	52 (6")	0	SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), moist, very stiff; ~50% silt, ~40% fine-to medium-grained sand, ~10% clay.	ML	Well Screen
15	■	16.0	86 (11")	0	Same as above, except saturated, with gravel, ~45% silt, ~40% sand, ~10% gravel, ~5% clay.		Sand
20					TD: 22.0 ft bgs		

(TRACE #319/PG/2206003)

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-6
 18460 Sonoma highway
 Boyes Hot Springs, California

PLATE

6

JOB NUMBER 0268,002.96	REVIEWED BY EC&A, Elizabeth Perry	DATE July 2003	REVISED	SHEET NO. 1 of 1
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BORING LOCATION				18460 Sonoma Hwy (~50 ft east of MW-8).		ELEVATION AND DATUM		TOC 133.06 ft		BORING NO.		MW-7	
DRILLING AGENCY				Clear Heart, Inc.		DRILLER		Rick		DATE STARTED		12 Sep 03	
DATE FINISHED				12 Sep 03		COMPLETION DEPTH		21.0 ft		SAMPLER		CA Modified Split Spoon	
DRILLING EQUIPMENT				CME-75 Rig		NO. OF SAMPLES		4 Soil					
DRILLING METHOD				Hollow Stem Auger		BORING DIA.		8.0 inches					
SIZE AND TYPE OF CASING				2.0 inch Schedule 40 PVC		FROM		0.0 ft TO		20.0 ft		WATER LEVEL	
										FIRST		~15 ft bgs	
										MEASURED / SAMPLED			
TYPE OF PERFORATION				0.010 inch slotted		FROM		5.0 ft TO		20.0 ft		CORE BARREL	
												2.0 inch ϕ	
												LENGTH	
												18 inches	
SIZE AND TYPE OF PACK				#2/12 Sand		FROM		4.0 ft TO		21.0 ft		LOGGED BY:	
												EAP	
												CHECKED BY:	
												RWE	
TYPE OF SEAL		NO. 1		Bentonite Chips		FROM		2.0 ft TO		4.0 ft		COMMENTS	
		NO. 2		Portland Cement Grout		FROM		0.0 ft TO		2.0 ft			
Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm).													

DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Approx. 2 inches of asphalt.		Lock Box
							Grout
							Bentonite
5		6.0	31	0	SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), moist, very stiff; ~50% silt, ~40% fine-to very coarse-grained sand (fine fraction > coarse), ~10% clay.	ML	2" PVC
10		11.0	24	3.6	Same as above, except decrease in sand content to ~35% very fine- to fine-grained sand, increase to ~15% clay; possible volatile organic compound (VOC) odor.		Well Screen
15		16.0	25	0.6	SILTY SAND (SM) with Gravel, light olive-brown (2.5Y 5/4), saturated, dense; ~50% fine- to very coarse-grained sand, ~40% silt, ~10% subrounded gravel up to 0.25 inch dia.	SM	
20		21.0	33	0	Same as above.		
					TD: 21.0 ft bgs		

(TRACE #319/PQ/22Oct03)

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-7
 18460 Sonoma highway
 Boyes Hot Springs, California

PLATE

7

JOB NUMBER	0268,002.96	REVIEWED BY	EC&A, Elizabeth Perry	DATE	September 2003	REVISED		SHEET NO.	1 of 1
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BORING LOCATION				18460 Sonoma Hwy. (in Mulford St., front of Apartments)				ELEVATION AND DATUM		TOC 131.22 ft		BORING NO.		MW-8	
DRILLING AGENCY				Clear Heart, Inc.				DRILLER		Chris		DATE STARTED		11 Sep 03	
DRILLING EQUIPMENT				Deep Rock DR10K truck-mounted rig				DATE FINISHED		11 Sep 03		COMPLETION DEPTH		20.5 ft	
DRILLING METHOD				Hollow Stem Auger				BORING DIA.		8.0 inches		SAMPLER		CA Modified Split Spoon	
SIZE AND TYPE OF CASING				2.0 inch Schedule 40 PVC				NO. OF SAMPLES				WATER LEVEL		FIRST ~10 ft	
TYPE OF PERFORATION				0.010 inch slotted				FROM		5.0 ft TO 20.0 ft		CORE BARREL		2.0 inch ϕ	
SIZE AND TYPE OF PACK				#2/12 Sand				FROM		4.0 ft TO 20.5 ft		LOGGED BY:		EAP	
TYPE OF SEAL				NO. 1 Bentonite Chips				FROM		2.0 ft TO 4.0 ft		COMMENTS		CHECKED BY: RWE	
				NO. 2 Portland Cement Grout				FROM		0.0 ft TO 2.0 ft					
DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION							USCS	WELL CONSTRUCTION		
					Approx. 4 inches of asphalt. (Not sampled-geology taken from MW-8D) SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), moist, stiff, tight; ~60% silt, ~20% fine-grained sand, ~20% clay; possible volatile organic compound (VOC) odor.							ML	Lock Box Grout Bentonite 2" PVC Well Screen Sand		
5					Same as above, except saturated, very stiff; increase in sand content to ~35% very fine-grained sand, decrease to ~50% silt and ~15% clay; possible VOC's.										
10					Same as above, except slightly less saturated.										
15					Same as above, except saturated, ~5% of sand content is very coarse-grained.										
20					TD: 20.5 ft bgs										

(TRACE #319/RG/22Oct03)

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-8
 18460 Sonoma highway
 Boyes Hot Springs, California

 PLATE
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JOB NUMBER	0268,002.96	REVIEWED BY	EC&A, Elizabeth Perry	DATE	July 2003	REVISED		SHEET NO.	1 of 1
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BORING LOCATION 18460 Sonoma Hwy [~6 ft east of MW-8 (shallow well)].				ELEVATION AND DATUM TOC 130.93 ft		BORING NO. MW-8D	
DRILLING AGENCY Clear Heart, Inc.			DRILLER Rick		DATE STARTED 10 Sep 03		DATE FINISHED 12 Sep 03
DRILLING EQUIPMENT CME-75 Rig				COMPLETION DEPTH 46.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD Solid Flight / Hollow Stem Auger			BORING DIA. 12 inches / 7 inches		NO. OF SAMPLES 9 Soil		
SIZE AND TYPE OF CASING 9 inch steel conductor 2.0 inch Schedule 40 PVC			FROM 0.0 ft TO 37.5 ft 0.0 ft TO 45.0 ft		WATER LEVEL FIRST ~10 ft bgs		MEASURED / SAMPLED
TYPE OF PERFORATION 0.010 inch slotted			FROM 37.5 ft TO 45.0 ft		CORE BARREL 2.0 inch ϕ		LENGTH 18 inches
SIZE AND TYPE OF PACK #2/12 Sand			FROM 36.5 ft TO 46.0 ft		LOGGED BY: EAP		CHECKED BY: RWE
TYPE OF SEAL		NO. 1 Bentonite Chips-Inside Casing -Annular Space		FROM 32.5 ft TO 36.5 ft 35.0 ft TO 37.5 ft	COMMENTS		
		NO. 2 Cement Grout-Inside Casing -Annular Space		FROM 0.0 ft TO 32.5 ft 0.0 ft TO 35.0 ft			

DEPTH (feet)	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
				Approx. 2 inches of asphalt.		Lock Box
5	6.0	23		SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), moist, stiff, tight; ~60% silt, ~20% fine-grained sand, ~20% clay; possible volatile organic compound (VOC) odor.	ML	2" PVC in 9" Steel Casing Grout
10	11.0	57		▽ Same as above, except saturated, very stiff; increase in sand content to ~35% very fine-grained sand, decrease to ~50% silt and ~15% clay; possible VOC's.		
15	16.0	28		▽ Same as above, except slightly less saturated.		
20	21.0	60		▽ Same as above, except saturated, ~5% of sand content is very coarse-grained.		

EDD CLARK & ASSOCIATES, INC.

ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-8D (deep)

18460 Sonoma highway
Boyes Hot Springs, California

PLATE

8

JOB NUMBER 0268,002.96

REVIEWED BY EC&A, Elizabeth Perry

DATE September 2003

REVISED

SHEET NO. 1 of 2

TRACE #319/RG/220d03

BORING LOCATION					CONTINUED LOG, SHEET NO.	2 of 2	FOR BORING NO.	MW-8D
DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION		USCS	WELL CONSTRUCTION
25		11.0	70 (11")		SILTY SAND (SM), dark yellowish-brown (10YR 4/6), saturated, very dense, tight, ~70% fine- to very coarse rounded sand, ~30% silt; VOC odor.		SM	
30		31.0	78 (11")		SANDY SILT (ML), light olive-brown (2.5Y 5/4), saturated, very dense, tight; ~65% silt, ~35% fine- to very coarse-grained sand (fine fraction > coarse).		ML	
35		36.0	79 (11")		SILTY SAND (SM) with Gravel, very dark gray (GLEYS N3/), saturated, very dense, tight; ~60% fine- to very coarse-grained sand, ~35% silt, ~5% subrounded gravel up to 0.25 inch dia.		SM	
40		38.5	89 (10")					
45		46.0	18	0.3	SANDY CLAY (CL), very dark gray (GLEYS N3), moist, stiff; ~70% clay, ~30% fine-grained sand.		CL	
					TD: 46.0 ft bgs			
50								

TRACE #319/R/G/22Oct03

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-8D (Continued)

PLATE

18460 Sonoma highway
Boyes Hot Springs, California

8

JOB NUMBER 0268,002.96

REVIEWED BY EC&A, Elizabeth Perry

DATE September 2003

REVISED

SHEET NO. 2 of 2

BORING LOCATION				18460 Sonoma Hwy (~64 ft west of MW-8D).				ELEVATION AND DATUM				TOC 130.84 ft				BORING NO.				MW-9															
DRILLING AGENCY				Clear Heart, Inc.				DRILLER				Rick				DATE STARTED				11 Sep 03				DATE FINISHED				11 Sep 03							
DRILLING EQUIPMENT				CME-75 Rig				COMPLETION DEPTH				21.0 ft				SAMPLER				CA Modified Split Spoon															
DRILLING METHOD				Hollow Stem Auger				BORING DIA.				8.0 inches				NO. OF SAMPLES				4 Soil															
SIZE AND TYPE OF CASING				2.0 inch Schedule 40 PVC				FROM				0.0 ft TO				20.0 ft				WATER LEVEL				FIRST ~11 ft bgs				MEASURED / SAMPLED				—			
TYPE OF PERFORATION				0.010 inch slotted				FROM				5.0 ft TO				20.0 ft				CORE BARREL				2.0 inch ϕ				LENGTH				18 inches			
SIZE AND TYPE OF PACK				#2/12 Sand				FROM				4.0 ft TO				21.0 ft				LOGGED BY:				EAP				CHECKED BY:				RWE			
TYPE OF SEAL		NO. 1		Bentonite Chips				FROM				2.0 ft TO				4.0 ft				COMMENTS				Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm).											
		NO. 2		Portland Cement Grout				FROM				0.0 ft TO				2.0 ft																			

DEPTH (feet)	Samples	Sample ID	Blows	PID (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Approx. 2 inches of asphalt.		Lock Box
							Grout
							Bentonite
5		6.0	66	1.3	SANDY SILT (ML) with Clay, light olive-brown (2.5Y 5/4), slightly moist, very stiff, tight; ~45% silt, ~35% very fine- to fine-grained sand (minor very coarse-grained sand), ~20% clay.	ML	2" PVC
10		11.0	24	0.3	Same as above, except wet, increase in sand content to ~40%, decrease to ~15% clay.		Well Screen
15		16.0	21	720	SILTY SAND (SM) with Gravel, light olive-brown (2.5Y 5/4), wet, dense, tight; ~50% fine- to very coarse-grained sand (fine fraction < coarse), ~45% silt, ~5% rounded granular gravel; strong volatile organic compound (VOC) odor.	SM	
20		21.0	23	0.8	Same as above, except less VOC odor.		
					TD: 21.0 ft bgs		

(TRACE #319/RG/22Oct03)

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF MONITORING WELL MW-9
 18460 Sonoma highway
 Boyes Hot Springs, California

PLATE

9

JOB NUMBER	0268,002.96	REVIEWED BY	EC&A, Elizabeth Perry	DATE	September 2003	REVISED		SHEET NO.	1 of 1
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Appendix B

Gore-Sorber Analytical Data

GORE™ Surveys - Final Report

KEY TO DATA TABLE 18460 Sonoma Highway, Boyes Hot Springs, CA

UNITS

µg	micrograms (per sorber), reported for compounds
MDL	method detection limit
bdl	below detection limit
nd	non-detect

ANALYTES

BTEX	combined masses of benzene, toluene, ethylbenzene and total xylenes (Gasoline Range Aromatics)
BENZ	benzene
TOL	toluene
EtBENZ	ethylbenzene
mpXYL	m-, p-xylene
oXYL	o-xylene
ct12DCE	cis- & trans-1,2-dichloroethene
t12DCE	trans-1,2-dichloroethene
c12DCE	cis-1,2-dichloroethene
TCE	trichloroethene
PCE	tetrachloroethene
11DCE	1,1-dichloroethene
VC	vinyl chloride

BLANKS

TBn	unexposed trip blanks, travels with the exposed modules
method blank	QA/QC module, documents analytical conditions during analysis

GORE(TM) SURVEYS FOR SITE ASSESSMENT AND MONITORING ANALYTICAL RESULTS
 EDD CLARK AND ASSOCIATES, INC., PHONERT PARK, CA
 CUSTOM TARGET COMPOUND LIST (A7)
 18460 SONOMA HIGHWAY, BOYES HOT SPRINGS, CA
 SITE CZI - PRODUCTION ORDER #12226693

DATE ANALYZED	SAMPLE NAME	BTEX, ug	BENZ, ug	TOL, ug	EIBENZ, ug	mpXYL, ug	oXYL, ug	cl12DCE, ug	tl12DCE, ug	c12DCE, ug	TCE, ug	PCE, ug	VC, ug	11DCE, ug
	MDL =		0.03	0.02	0.02	0.02	0.07	0.02	0.03	0.02	0.03	0.41	0.04	nd
5/5/05	473458	0.23	nd	nd	0.03	0.13	0.07	nd	nd	nd	nd	nd	nd	nd
5/5/05	473459	1.21	nd	0.03	0.19	0.70	0.29	nd	nd	nd	nd	0.16	nd	nd
5/5/05	473460	0.65	nd	nd	0.09	0.39	0.17	nd	nd	nd	nd	5.56	nd	nd
5/4/05	473461	0.00	bdl	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/5/05	473462	0.49	nd	0.02	0.06	0.27	0.14	nd	nd	nd	nd	14.76	nd	nd
5/5/05	473463	0.48	nd	0.02	0.06	0.23	0.16	nd	nd	nd	nd	0.72	nd	nd
5/4/05	473464	0.41	nd	bdl	0.05	0.22	0.14	nd	nd	nd	nd	3.65	nd	nd
5/5/05	473465	0.28	nd	0.05	0.03	0.14	0.06	nd	nd	nd	nd	1.19	nd	nd
5/5/05	473466	0.16	nd	nd	0.02	0.09	0.04	nd	nd	nd	0.03	39.92	nd	nd
5/5/05	473467	0.02	nd	nd	nd	0.02	nd	nd	nd	nd	nd	41.32	nd	nd
5/4/05	473468	0.00	nd	nd	nd	bdl	nd	nd	nd	nd	nd	10.90	nd	nd
5/5/05	473469	0.04	nd	nd	nd	0.04	bdl	nd	nd	nd	nd	9.00	nd	nd
5/4/05	473470	0.86	nd	0.12	0.13	0.45	0.17	0.06	nd	0.06	0.08	22.36	nd	nd
5/5/05	473471	0.00	nd	nd	nd	bdl	nd	nd	nd	nd	nd	0.06	nd	nd
5/5/05	473472	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd
5/5/05	473473	0.15	nd	nd	0.02	0.09	0.04	nd	nd	nd	nd	0.58	nd	nd
5/4/05	473474	0.99	nd	0.03	0.16	0.55	0.26	nd	nd	nd	nd	2.34	nd	nd
5/5/05	473475	0.54	bdl	0.09	0.07	0.27	0.12	nd	nd	nd	nd	0.89	nd	nd
5/5/05	473476	0.29	0.04	0.07	0.03	0.10	0.05	2.92	0.05	0.05	2.87	1.16	134.09	1.83
5/4/05	473480	0.09	nd	nd	bdl	0.06	0.03	16.42	0.21	16.21	1.52	0.83	nd	bdl
5/5/05	473481	0.06	nd	nd	bdl	0.03	0.02	0.43	0.24	0.43	0.11	0.24	nd	nd
5/5/05	473482	0.05	0.03	nd	nd	0.02	bdl	1.41	0.05	1.37	0.31	0.93	2.12	bdl
5/4/05	473483	nd	nd	nd	nd	nd	nd	0.00	nd	nd	bdl	nd	nd	nd
5/5/05	473484	0.02	nd	nd	nd	0.02	bdl	nd	nd	nd	nd	0.04	nd	nd
5/5/05	473485	0.05	nd	nd	bdl	0.05	bdl	nd	nd	nd	nd	0.20	nd	nd
5/5/05	473486	0.04	nd	nd	bdl	0.04	nd	nd	nd	nd	nd	bdl	nd	nd
5/5/05	473487	0.07	nd	nd	bdl	0.05	0.03	nd	nd	nd	nd	nd	nd	nd
5/4/05	473488	0.18	nd	nd	0.02	0.10	0.06	nd	nd	nd	nd	nd	nd	nd
5/5/05	473489	0.19	nd	nd	0.03	0.11	0.05	nd	nd	nd	nd	0.27	nd	nd
5/5/05	473490	0.02	nd	nd	nd	0.02	nd	nd	nd	nd	nd	nd	nd	nd
5/5/05	473491	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/5/05	473492	0.27	nd	nd	0.04	0.16	0.07	nd	nd	nd	nd	3.33	nd	nd
5/5/05	473493	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/4/05	method blank	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/5/05	method blank	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Maximum	1.21	0.04	0.12	0.19	0.70	0.29	16.42	0.21	16.21	1.52	134.09	2.12	0.05
	Standard Dev.	0.32	0.01	0.03	0.05	0.18	0.08	3.02	0.04	2.98	0.34	25.89	0.50	0.01
	Mean	0.25	0.00	0.01	0.03	0.14	0.07	0.71	0.01	0.70	0.11	9.67	0.13	0.00

No mdl is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

GORE(TM) SURVEYS ANALYTICAL DATA
 EDD CLARK AND ASSOCIATES, INC., POHNERT PARK, CA
 GORE TOTAL PETROLEUM HYDROCARBONS (A9a)
 18460 SONOMA HIGHWAY, BOYES HOT SPRINGS, CA
 SITE CZI - PRODUCTION ORDER #12226693

DATE ANALYZED	SAMPLE NAME	TPH, ug
MDL =		
05/05/2005	473458	0.05
05/05/2005	473459	13.32
05/05/2005	473460	0.94
05/04/2005	473461	0.01
05/05/2005	473462	3.18
05/05/2005	473463	86.50
05/04/2005	473464	0.42
05/05/2005	473465	0.16
05/05/2005	473466	0.19
05/05/2005	473467	0.04
05/04/2005	473468	0.02
05/05/2005	473469	0.02
05/04/2005	473470	0.32
05/05/2005	473471	0.18
05/05/2005	473472	0.04
05/05/2005	473473	3.66
05/04/2005	473474	15.11
05/05/2005	473475	1.53
05/04/2005	473476	6.41
05/04/2005	473480	0.84
05/05/2005	473481	6.29
05/05/2005	473482	18.14
05/04/2005	473483	2.52
05/05/2005	473484	2.84
05/05/2005	473485	0.41
05/05/2005	473486	0.24
05/05/2005	473487	0.63
05/04/2005	473488	2.84
05/05/2005	473489	3.67
05/05/2005	473490	0.08
05/05/2005	473491	0.00
05/05/2005	473492	0.92
05/05/2005	473493	0.02
05/04/2005	method blank	nd
05/05/2005	method blank	0.03
	Maximum	86.50
	Standard Dev.	15.96
	Mean	5.69

No mdl is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bol.

GORE(TM) SURVEYS ANALYTICAL RESULTS
 EDD CLARK AND ASSOCIATES, INC., PHONERT PARK, CA
 GASOLINE RANGE HYDROCARBONS
 18460 SONOMA HIGHWAY, BOYES HOT SPRINGS, CA
 SITE CZ1 - PRODUCTION ORDER #12226693

DATE ANALYZED	SAMPLE NAME	GRPH, ug
05/05/05	MDL =	0.09
05/05/05	473459	6.30
05/05/05	473460	0.31
05/04/05	473461	nd
05/05/05	473462	0.45
05/05/05	473463	11.45
05/04/05	473464	0.74
05/05/05	473465	0.48
05/05/05	473466	bdl
05/05/05	473467	bdl
05/04/05	473468	bdl
05/05/05	473469	bdl
05/04/05	473470	0.45
05/05/05	473471	0.13
05/05/05	473472	bdl
05/05/05	473473	0.15
05/04/05	473474	1.45
05/05/05	473475	1.99
05/05/05	473476	16.01
05/04/05	473480	2.12
05/05/05	473481	3.34
05/05/05	473482	52.00
05/04/05	473483	5.86
05/05/05	473484	0.60
05/05/05	473485	bdl
05/05/05	473486	0.15
05/05/05	473487	0.47
05/04/05	473488	0.52
05/05/05	473489	0.21
05/05/05	473490	0.36
05/05/05		
05/05/05	473491	nd
05/05/05	473492	1.46
05/05/05	473493	nd
05/04/05	method blank	nd
05/05/05	method blank	nd
	Maximum	52.00
	Standard Dev.	10.01
	Mean	3.65

No mdl is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.